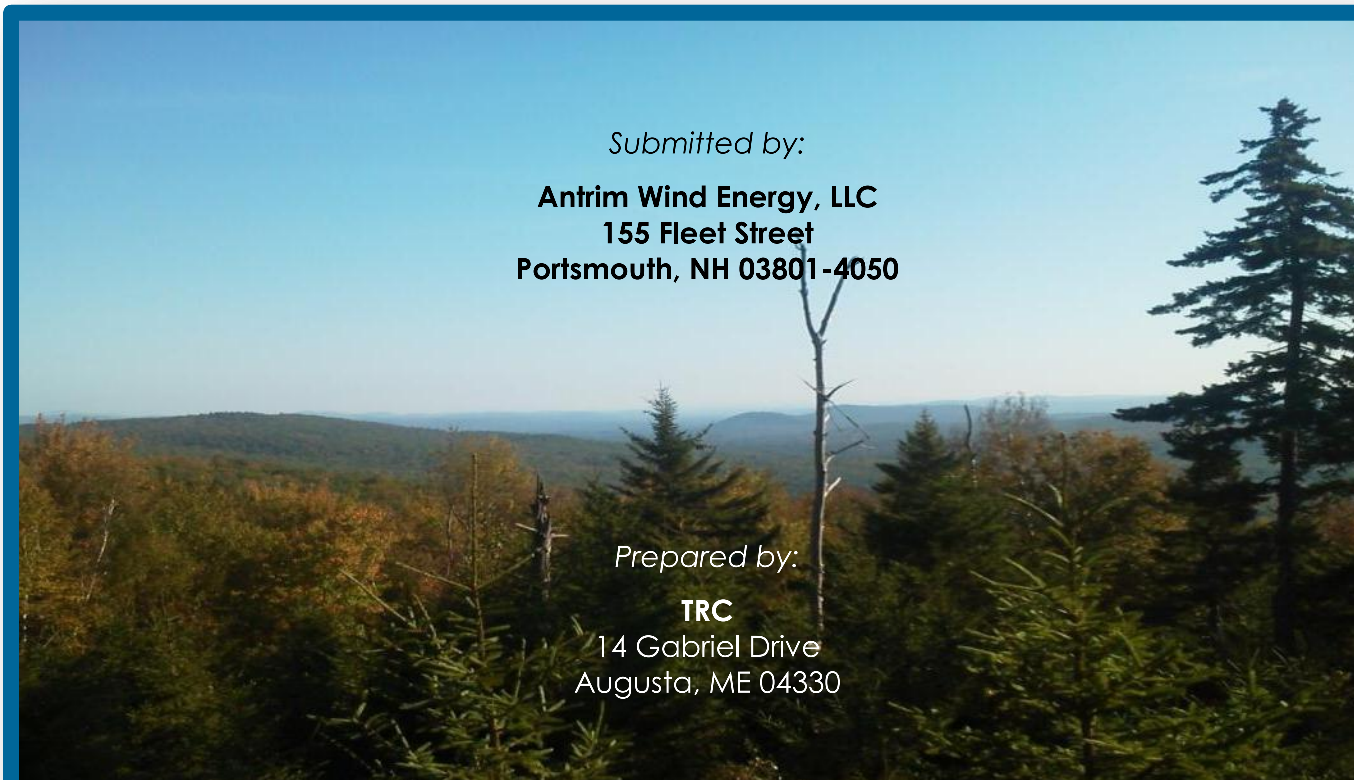
NEW HAMPSHIRE SITE EVALUATION COMMITTEE

APPLICATION OF ANTRIM WIND ENERGY, LLC FOR A CERTIFICATE OF SITE AND FACILITY

DOCKET NO. 2012-__



Submitted by:

Antrim Wind Energy, LLC
155 Fleet Street
Portsmouth, NH 03801-4050

Prepared by:

TRC
14 Gabriel Drive
Augusta, ME 04330

January 31, 2012

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A. SIGNATURE OF APPLICANT

Certification by Executive Officer of Antrim Wind Energy, LLC

In accordance with RSA 162-H:8, I, John B. Kenworthy, an Executive Officer of Antrim Wind Energy, LLC, do hereby swear and affirm that the information contained in this Application is true and accurate to the best of my knowledge and belief.

I also certify that, as an Applicant to the New Hampshire Site Evaluation Committee, Antrim Wind Energy, LLC, agrees to provide such information as the Committee shall require to carry out the purposes of RSA 162-H.

Antrim Wind Energy, LLC

Name: John B. Kenworthy

Title: Executive Officer

Date: January 25, 2012

State of New Hampshire

County of Rockingham

On this day 25 of January 2012, personally appeared before me the above-name John B Kenworthy Executive Officer of Antrim Wind Energy LLC and swore and affirmed that the information contained in this Application is true and accurate to the best of his knowledge and belief.

Katrina Ricker

Notary Public/Justice of the Peace

My Commission expires: March 24, 2015

KATRINA RICKER
MY COMMISSION EXPIRES MAR. 24, 2015
NOTARY PUBLIC
NEW HAMPSHIRE

B. APPLICANT INFORMATION

B.1. The name of the applicant

Antrim Wind Energy, LLC

B.2. The applicant's mailing address, telephone and fax numbers, and e-mail address

Antrim Wind Energy, LLC
155 Fleet Street
Portsmouth, NH 03801-4050
Telephone: 603-570-4842
Fax: 603-386-6743
Email: generate@eolian-energy.com

B.3. The name and address of the applicant's parent company, association or corporation if the applicant is a subsidiary

Antrim Wind Energy, LLC ("AWE") is a Delaware limited liability company formed in 2009 as a special purpose entity to develop, build, own and operate the Antrim Wind Energy Project ("the Project" or "Facility"). AWE has two members – Eolian Antrim, LLC and Westerly Antrim, LLC who each own and control 50% of AWE. Both of these members are registered Delaware limited liability companies and are owned by Eolian Renewable Energy, LLC ("Eolian") and Westerly Wind, LLC ("Westerly"), respectively. Westerly is a portfolio company of US Renewables Group ("USRG"). AWE operates from the offices of Eolian Renewable Energy, LLC at 155 Fleet Street, Portsmouth, NH 03801. The names and addresses of its parent companies are listed below.

Eolian Antrim, LLC and
Eolian Renewable Energy, LLC
155 Fleet Street
Portsmouth, NH 03801-4050
Telephone: 603-570-4842
Fax: 603-386-6743
Email: generate@eolian-energy.com
Website: www.eolian-energy.com

US Renewables Group
2425 Olympic Boulevard
Suite 4050W
Santa Monica, CA 90404

Westerly Antrim, LLC and
Westerly Wind, LLC
25 Braintree Hill Park, Suite 200
Braintree, MA 02184
Telephone: 781-930-3190
Email: info@westerlywind.com

B.4. If the applicant is a corporation

B.4.a. The state of incorporation

See application Section B. 3.

B.4.b. The corporation's principal place of business

See application Section B.3.

B.4.c. The names and addresses of its directors, officers and stockholders;

The following is a list of owners, officers, and managers of: Antrim Wind Energy, LLC; Eolian Antrim, LLC; and Westerly Antrim, LLC.

Antrim Wind Energy, LLC: Delaware limited liability company

Members
- Eolian Antrim, LLC
- Westerly Antrim, LLC

Officers
- John B. Kenworthy, Executive Officer
- John M. Soininen, Executive Officer
- Joseph Cofelice, Executive Officer
- Peter Mara, Executive Officer
- Sean McCabe, Executive Officer

Eolian Antrim, LLC: Delaware limited liability company

Member
- Eolian Renewable Energy, LLC

Officers
- John B. Kenworthy, President and CEO
- John M. Soininen, Vice President
- James A. Kenworthy, Vice President

Managers
- John B. Kenworthy
- John M. Soininen
- James A. Kenworthy

Westerly Antrim, LLC: Delaware limited liability company

Member
Westerly Wind, LLC

Officers
Joseph Cofelice, President and CEO
Peter Mara, Vice President
Sean McCabe, Vice President

Managers
Joseph Cofelice
Peter Mara
Sean McCabe

B.5. If the applicant is an association, the names and addresses of the residences of the members of the association

Antrim Wind Energy, LLC is not an association.

B.6. Whether the applicant is the owner or lessee of the site or facility or has some legal or business relationship to it

Antrim Wind Energy, LLC has a leasehold interest in seven properties in the Town of Antrim. These properties are owned by five distinct private landowners, and comprise the entire proposed Project area in Antrim. All lease rights have been recorded at the Hillsborough County Registry of Deeds. The leases have an initial term of 25 years with an option to extend the lease for an additional 25 years.

B.7. Statement of assets and liabilities of the applicant

A redacted financial statement is provided in Appendix 1 of this Application.

An unredacted version of Appendix 1 is filed separately with a Motion for Protective Order and Confidential Treatment.

C. SITE INFORMATION

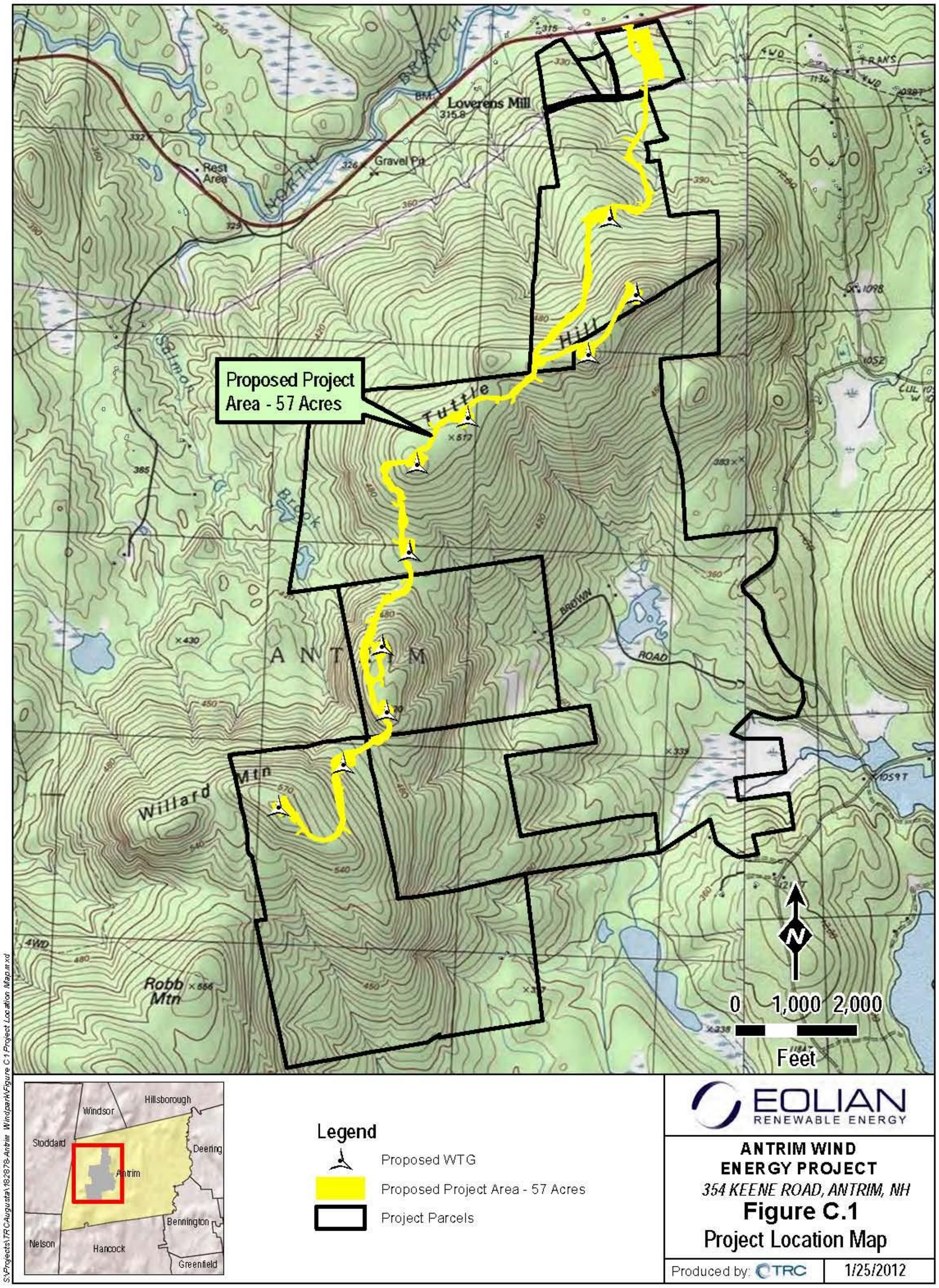
C.1. Location and address of the site of the proposed facility

The entirety of the Project is located in the sparsely settled rural conservation zoning district in northwest portion of the Town of Antrim. Specifically, the Project is proposed to be located on and adjacent to 354 Keene Road (NH Route 9) and includes approximately 1,850 acres of private lands currently leased by AWE from five landowners. The lease area will be reduced to include only the as-built windpower facilities and buffers after construction is completed. These lands occupy the area from Route 9, southward to the east summit of Tuttle Hill, and to the north flank of Willard Mountain to the west. The Project will be constructed primarily on the ridgeline that starts approximately 0.75 miles south of NH Route 9 and runs south southwest, for approximately 2.5 miles.

Between the ridgeline (where the proposed turbine string will be located) and Route 9, to the north, is a Public Service of New Hampshire (PSNH) transmission corridor containing both a 115 kV electric transmission line and a 34.5 kV electric distribution circuit. AWE proposes to interconnect the Project to the grid by building a substation to interconnect to the 115 kV line known as L163. This transmission right of way (and point of interconnection) is approximately halfway between Route 9 and the northern-most turbine, and runs through property currently leased by AWE. Proposed access to the Project site is from Route 9 up the north slope of Tuttle Hill ridge.

A map of the Project location is provided as Figure C.1

Figure C.1: Project Location Map



C.2. Site acreage, shown on an attached property map and located by scale on a U.S. Geological Survey or GIS map

The Project is located in the sparsely settled rural conservation zoning district in Antrim on approximately 1,850 acres of private lands leased by AWE from five landowners. These areas are depicted on Figure C.1, as referenced in Section C.1, above.

As is typical with wind projects, the Project will occupy only a very small fraction of this land post-construction. The area of direct impact (e.g. roads, turbine pads and other facilities) will be approximately 57 acres. This represents only 3% of the total amount of the leased land described above.

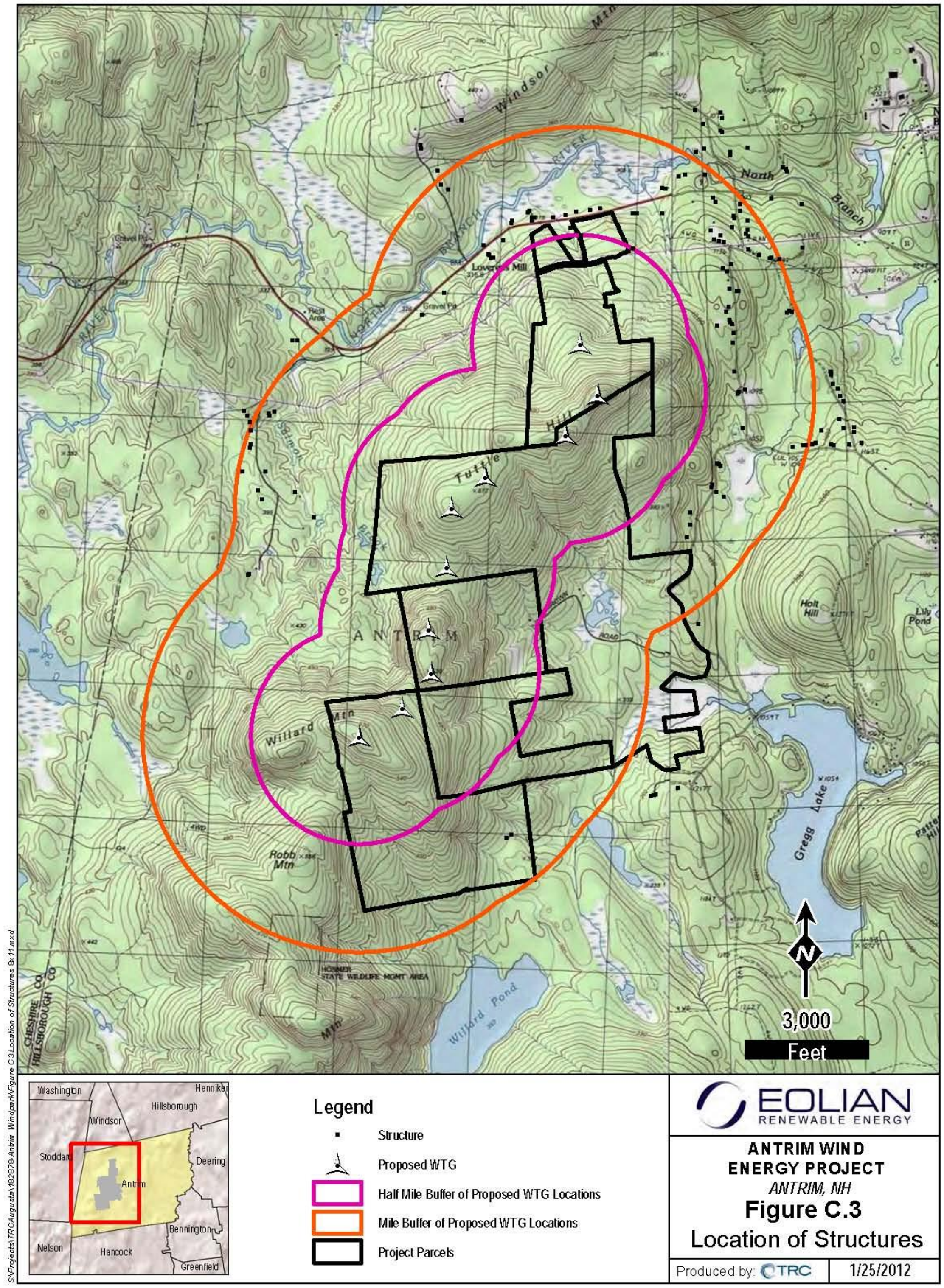
C.3. The location of residences, industrial buildings, and other structures and improvements within or adjacent to the site

Development adjacent to the proposed Project site consists primarily of rural residential dwellings (and their associated outbuildings) and seasonal camps. In general, this development is clustered along Route 9, to the north; Reed Carr Road, to the northeast; the north end of Craig Road, to the east; Brimstone Corner Road, to the southeast; and Salmon Brook Road, to the northwest.

The nearest year-round residence is located approximately ½ mile due north of the northernmost proposed turbine (Turbine #1) on Tuttle Hill. The owner of this residence is among the parties that have entered into lease agreements with AWE. The closest structure owned by a party who does not have a lease agreement with AWE is a seasonal hunting camp located approximately ½ mile to the northeast of the northernmost proposed turbine on Tuttle Hill.

All other structures are located greater than ½ mile from proposed turbine locations. The locations of structures relative to the proposed Project site are illustrated on Figure C.3.

Figure C.3: Location of Residences, Buildings and Other Structures Relative to the Proposed Project Site.



C.4. Identification of wetlands and surface waters of the state

Wetlands, surface waters and vernal pools throughout the Project area have been delineated by a New Hampshire certified wetland scientist. The National Wetlands Inventory mapping identified 0.6 acres of wetlands within the 462 acre wetland survey area. Field delineations within the same area revealed approximately 6.4 acres of wetland within the study area. The complete results of these efforts are summarized in Section I of this Application. Full study reports for wetland and vernal pool studies are provided in Appendix 11c and 11D, respectively, of this Application.

Furthermore, surface waters of the site are described in detail in the application forms, design plans, and maps provided in conjunction with the NHDES Standard Dredge & Fill Permit Application, NHDES Site Specific Terrain Alteration Application, and NHDES Section 401 Water Quality Certification Request, discussed in Section D of this Application. These documents are included in Appendix 2, as referenced in Section D.3 of this Application.

C.5. Identification of natural and other resources at or within or adjacent to the site

C.5.a. General setting

Most of the Town of Antrim is undeveloped, and a large proportion of the town's landscape is heavily wooded. Much of Antrim's forested areas are located in the Rural and Rural Conservation Zoning Districts of town; these two districts constitute over 70% of Antrim's total area. These woodlands are viewed by the town as a renewable resource and are logged on a regular basis. (Town of Antrim 2011). In addition to abundant woodland, there are also numerous conservation areas, hiking trails and water features.

Historically, the area of the proposed Project was cleared for sheep farming; numerous stone walls still remain as a result of this historic activity. After the decline of sheep farming, the site was allowed to regenerate into a forested condition. Subsequently, timber harvesting has occurred in many areas on Tuttle Hill and Willard Mountain. Currently, the land in and around the area of proposed development consists of undeveloped forest land in various stages of maturity, ranging from recent clearcuts and early successional stands as a result of timber harvesting, to mature forested areas.

In order to describe the current landscape of the proposed Project area in detail, a natural community survey was performed in 2011. This effort served to classify the landscape of the proposed Project into discrete natural communities, and to identify any significant, unique or rare natural communities. The results of this effort are summarized in Section I.5, and the full Natural Communities Report is provided in Appendix 11A of this Application.

C.5.b. Wildlife Resources

The Town of Antrim's extensive undeveloped lands and diverse natural resources provide ample haven for a wide diversity of wildlife. The abundant natural resources in and around the proposed Project area provide ample habitat opportunities for many of New

Hampshire's indigenous wildlife species. Wildlife studies that have been performed specific to the proposed Project are described in Section I.5.c of this Application.

C.5.c. Water Resources

The Town of Antrim has numerous water resources. The area of the proposed Project is located near three of the town's notable water bodies; these include the North Branch River, Gregg Lake, and Willard Pond.

The North Branch River runs along the north side of Route 9, in the valley to the north of the proposed Project area. The North Branch is a major tributary of the Contoocook River; it flows northerly from Highland Lake in Stoddard to its confluence with the Contoocook River in Hillsborough. The North Branch River was placed in the New Hampshire Rivers Management and Protection Program in June 1991.

Gregg Lake is located in the valley to the southeast of Tuttle Hill. The lake is approximately 195 acres in size and supports a moderate warm water fishery. A public access and recreational area is located on the north end of the lake. Recreational uses include fishing, swimming, picnicking, water skiing, boating, sailing, and bird watching.

Willard Pond is located in the valley to the southeast of Willard Mountain. The pond is approximately 96 acres in size and is part of the dePierrefeu-Willard Pond Wildlife Sanctuary (see Section C.5.d). The pond has an excellent cold water fishery, which makes it popular for fly fishing. Non-motorized boating and bird watching are also primary recreational activities associated with the pond.

Wetland and Vernal Pool resources specific to the proposed Project are further described in Section I.5.b of this Application.

C.5.d. Conservation Lands

Significant conservation areas exist in the immediate vicinity of the proposed Project. These include the dePierrefeu-Willard Pond Wildlife Sanctuary, the Loverns Mill Cedar Swamp Preserve, and the Meadow Marsh Preserve.

The New Hampshire Audubon's dePierrefeu-Willard Pond Wildlife Sanctuary is located immediately to the south of Willard Mountain. This sanctuary, at over 1,000 acres, is the New Hampshire Audubon's largest property. Additional easements, and adjacent protected lands bring the entire protected area surrounding the preserve to over 2,000 acres. Associated with this preserve are numerous hiking trails and road access to Willard Pond. Willard Pond is approximately 96 acres in size and is surrounded by Bald Mountain and Goodhue Hill. There are four substantial trails in the sanctuary's system, two of which go to the summits of Bald Mountain and Goodhue Hill.

The Meadow Marsh Preserve is a short trail (approximately 0.5 miles) that accesses wetland areas to the north of Gregg Lake. The preserve is located on property that is maintained by the Town of Antrim.

The Loverns Mill Cedar Swamp Preserve is located on the north side of Route 9, to the north of the proposed Project area. This 613 acre conservation project is cooperatively maintained by the Nature Conservancy and the Society for the Protection of New Hampshire Forests. The preserve contains several trails and features a boreal cedar swamp that is nearly 50 acres in size. Nature conservation partners have connected the preserve to a larger conservation project which is to include the 5,000 acre Peirce Reservation (in Stoddard and Windsor) and the 1693 acre Otter Brook Preserve (located in the towns of Sullivan and Nelson).

C.6. Information related to whether the proposed site and facility will unduly interfere with the orderly development of the region having given due consideration to the views of municipal and regional planning commissions and municipal governing boards.

Antrim Wind Energy's preliminary site evaluation assessed numerous factors that are critical to the appropriate siting of an economically and environmentally successful wind project that is compatible with the community in which it is located. In general, the most viable wind sites include: adequate projected wind speeds at anticipated turbine hub height; proximity to adequate transportation infrastructure to allow wind farm component and construction equipment delivery; proximity to transmission or distribution infrastructure capable of handling the new generation; adequate setbacks from residences or other inhabited structures to ensure public safety; the absence of known sensitive ecological resources that may be disturbed such as critical wildlife habitats, major wetlands, and other sensitive areas within the proposed Project area; and previous environmental impact and activities on site. The proposed site in Antrim meets all of these criteria.

Importantly, the proposed Project site is located approximately ½ mile from an existing PSNH transmission corridor where the Project proposes to interconnect to the grid. This eliminates the need for new transmission line construction, thereby entirely avoiding the numerous potential impacts associated with such development. The site is also located approximately ¾ mile from Route 9, a substantial state highway that can handle transportation of turbine components and construction equipment. The proximity of this existing highway minimizes the need for extensive access development, thereby reducing impacts associated with access.

The proposed site is located on private property that has been historically managed as timberlands; development of the site will not preclude this historic use which can continue largely unencumbered. For this reason, the proposed Project is deemed compatible with existing uses.

The Antrim Master Plan, updated as recently as 2010, speaks extensively and supportively of the need for renewable energy development. See Appendix 15. The Master Plan contains a 15-page section addressing climate change, energy efficiency and renewable energy and calls for the Planning Board and Planning Department to encourage renewable energy uses. The Project is clearly consistent within these goals. In addition, the Project will support many of the Southwest Regional Planning Commission's stated goals. The Commission identifies "current lack of local, renewable energy alternatives" to conventional energy sources a substantial risk to future growth in the region. See Appendix 16, p. 79. Significantly, New Hampshire state planning and zoning laws require that planning regulations and zoning ordinances encourage the installation and use of renewable forms of energy such as wind projects. *See* RSA 672:1, III-a and RSA 674:17, I. (j).

Additionally, Antrim Wind Energy will be providing substantial conservation benefits by permanently conserving 685 acres in and around the Project area. The Project would also provide wind lease revenues to the private landowners, resulting in direct and indirect economic impacts locally. This income mitigates the need for the landowners to develop the land for other permitted purposes such as residential subdivisions, which in turn require more municipal services.

The proposed Facility is expected to provide clean, domestically produced electricity in an amount equivalent to the annual consumption of approximately 13,500 average New Hampshire homes, while also providing jobs, tax benefits, and conservation benefits to the Town and the region. The proposed Project will not burden the Town with costs typically associated with other forms of development, such as new or larger schools, busing, police and public safety, snow removal or other similar municipal costs. In addition to the direct benefits of the annual tax payments, property lease revenues, clean energy benefits and land preservation opportunities, Antrim Wind Energy will seek to use as much qualified local labor as possible throughout the permitting, development, construction and operation of the facility. This will include opportunities for site clearing, construction, surveying, maintenance and other related jobs. Further, based upon current negotiations with the Town of Antrim on an agreement for payment in lieu of taxes ("PILOT"), the Antrim Wind Energy Project would become the largest taxpayer in the Town of Antrim. Please see Section J and Appendix 14 for a further discussion of the economic impacts to the Town of Antrim and to the region.

In summary, the proposed Project will not unduly interfere with the orderly development of the region. The installation of a renewable energy facility in a sparsely settled area of Town on large tracts of private property is in concert with the orderly development of the region, especially considering the site's close proximity to an existing transmission corridor and a state highway. The Antrim Wind Energy Project will also bring about economic development and significant new permanent conservation opportunities.

Finally, the proposed Project will provide clean energy, which is consistent with the stated goals of NH statutes, the Antrim Master Plan, and Antrim residents' desires as presented in the Antrim Master Plan (Antrim 2010). These desires were reiterated on November 8, 2011, when voters in the Town of Antrim defeated two ballot articles relating to large-scale wind energy projects in the Town. The first article, which asked voters to adopt a large-scale wind ordinance that would severely restrict wind development, failed by a vote of 501 to 309. The second article, which would have prohibited wind turbines and meteorological towers in the town's Rural Conservation District (where the Project is located), failed by a vote of 584 to 225.

D. OTHER REQUIRED APPLICATIONS AND PERMITS

D.1. Identification of all other federal and state government agencies having jurisdiction, under state or federal law, to regulate any aspect of the construction or operation of the proposed facility

- New Hampshire Department of Environmental Services, Water Division, Wetlands Bureau (authority under state and federal law over wetlands impacts)
- New Hampshire Department of Environmental Services, Water Division, Alteration of Terrain (AoT) Program (authority under state and federal law over alteration of terrain and pollutant discharge)
- New Hampshire Department of Environmental Services, Water Division, Water Management Bureau (authority under federal law related to U.S. Army Corps of Engineers (USACE) individual wetlands permit – water quality certification)
- New Hampshire Department of Transportation (NHDOT) (authority under state law over highway safety/transportation of oversized loads and driveway permits)
- New Hampshire Department of Safety (NHDOS) (blasting permit)
- New Hampshire Division of Historic Resources (NHDHR) (authority under federal and state law to consult with USACE regarding historic properties potentially affected by the Project
- U.S. Army Corps of Engineers (USACE) (authority under federal law to assess wetlands and other environmental impacts)
- Federal Aviation Administration (FAA) (regulation of turbine lighting in connection with determination of "no hazard" to air navigation)
- New Hampshire Department of Environmental Services, Water Division, Subsurface Systems Bureau Individual Sewage Disposal System (ISDS) Application

D.2. Documentation that demonstrates compliance with the application requirements of such agencies;

Information satisfying the application requirements of the agencies listed above in D.1 has been included within the agency application forms. Copies of these forms are included in the Appendices to this Application, as referenced in Section D.3, below. An application for a "Special Permit to Move a Load in Excess of Legal Limit" will be submitted to the NHDOT by the trucking contractor who will be responsible for transporting turbine equipment and other oversized loads. The trucking contractor will be chosen once all Project permits are issued, all commercial agreements are finalized and turbine equipment ordered. AWE will comply with all rules and permit requirements relative to blasting that may be necessary in the construction and decommissioning of the Project.

D.3. A copy of the completed application form for each such agency

Copies of completed application forms, as required, are provided in Appendix 2 of this Application. Specific permit applications and their locations are included as follows:

- **Appendix 2A**: Joint USACE/NH DES Standard Dredge and Fill Permit Application
- **Appendix 2B**: NH DES Alteration of Terrain Application
- **Appendix 2C**: NH DES Section 401 Water Quality Certification Request
- **Appendix 2D**: NH DOT Application for Driveway Permit
- **Appendix 2E**: FAA Determination of No Hazard
- **Appendix 2F**: NH DES ISDS Application

D.4. Identification of any requests for waivers from the information requirements of any state agency or department whether represented on the committee or not.

AWE is requesting a waiver of Rule Env-Wq 1504.08(b)(2)(b) High Intensity Soil Mapping and/or Site Specific Soil Mapping of the Alteration of Terrain Permit Application. The waiver request is located in Appendix 3 of this Application.

E. ENERGY FACILITY INFORMATION

The proposed Antrim Wind Energy Project meets the definition of a renewable energy facility under RSA 162-H:2, XII, not an energy facility as defined in RSA 162-H:2,VII. The Applicant notes that the statutory definition of "Energy Facility" includes a "renewable energy facility" (*see* RSA 162-H:2, VII. [f]); however, the definition of "energy facility" contained in N.H. Admin. Rule Site 102.09 is based on an outdated statutory definition which does not apply to Antrim Wind Energy, LLC. Although the Antrim Wind Energy Project does not meet the definition of "energy facility" contained in the Committee's rules, the Applicant is nonetheless completing this section of the Application in an effort to assist the Committee with its review of the Application.

E.1. The type of facility being proposed

Antrim Wind Energy, LLC proposes to construct and operate a wind energy facility.

E.2. A description of the process to extract, produce, manufacture, transport or refine the source of energy

The source of energy to be used by this facility is wind. As such, the source of energy to be used by the proposed Project requires no extraction, manufacturing, combustion, transportation or refinement.

E.3. The facility's size and configuration

The facility's size, in terms of generating capacity of the Project, is expected to be 30 MW. The Project will consist of 10 turbines each with a nameplate generating capacity of 3 MW. The final nameplate capacity of the Facility will depend on final turbine selection; at the time of application submittal, AWE has not finalized its turbine selection. For the purposes of the studies performed herein, Antrim Wind has evaluated the Acciona AW-116 3 MW turbine (AW-116/3000). This turbine is a horizontal axis machine configured much like any other typical wind turbine in that its major components include a tower, a nacelle, and a rotor with three blades. A 3 MW generator is housed in the nacelle which is mounted on a sliding ring that allows it to rotate into the wind to maximize energy production. The nacelle is installed on a 92.5M tall tubular steel tower. Each turbine has a rotor diameter of 116 meters. The total turbine height from foundation to blade tip is 492 feet. Additional details concerning the configuration of the AW-116/3000 turbine are found in Appendix 5. This is physically the largest turbine that Antrim Wind is presently considering for the installation in this Project. Thus all of the potential impacts related to Project construction or operation will be equal to or less than those presented in this application should a different turbine model ultimately be chosen for installation.

The proposed Project will be located on approximately 1,850 acres of private lands that are leased by AWE from five landowners. These parcels are illustrated on Figure C.1, as referenced in Section C.1 of this Application. Post-construction, the Project area will be reduced to include only the footprint of the disturbed area of the Project's facilities and any required setbacks and undisturbed buffers. The total area is anticipated to include 57 acres of actual development impact (e.g. access roads, turbine pads, substation and other facilities).

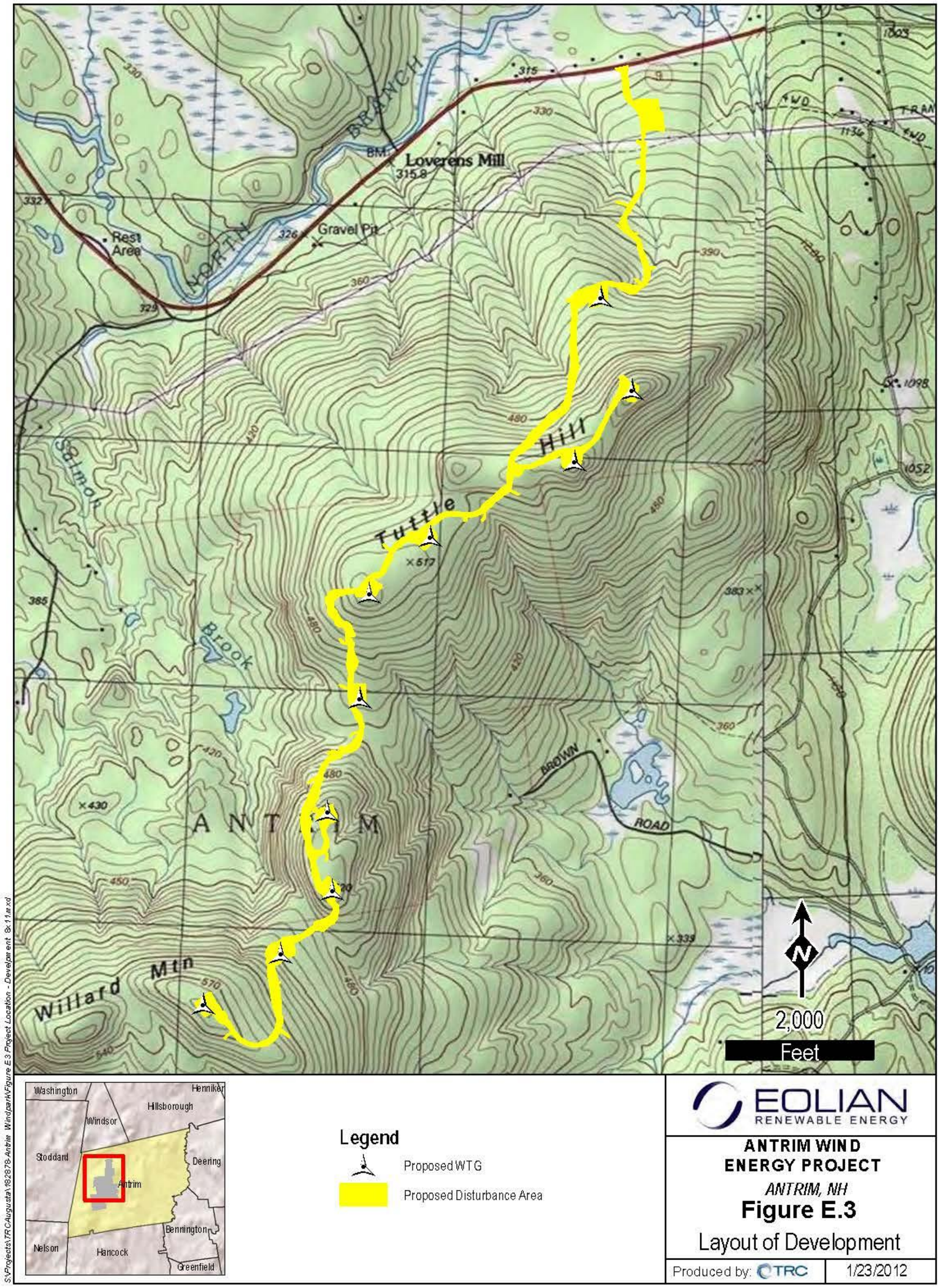
The Project's configuration is generally narrow and linear, as is typical of wind turbine strings on ridges in the Northeast. The area of development will consist of a series of turbines located primarily along the ridges and upper slopes of Tuttle Hill and Willard Mountain. These turbines will be linked by a private, gated gravel surface access road.

Approximately 4 miles of new gravel surface road will be built for access, construction and maintenance of the wind turbines. The main access road will be approximately 3.47 miles (18,318 feet) long and will be built in two sections. The first section will connect Rte. 9 to wind turbine generator (WTG) #1; this section will be approximately 0.7 miles (3,710 feet) long and 16 feet wide. The second section includes the remainder of the road, from WTG #1 to the ridge and then along the ridgeline. This section will be approximately 2.77 miles (14,608 feet) long and will be 34 feet wide during the construction phase. Once the Project is complete, the shoulder areas of this section of road will be restored and reseeded (using approved New Hampshire native seed mixes) to a final width of 16 feet. There will also be two spur roads installed to access individual turbines; one will be approximately 0.4 miles (2,127 feet) long and the other will be approximately 0.14 miles (765 feet) long. Like the main access road, these spur roads will be 34 feet wide during the construction phase, then restored and reseeded upon Project completion to a final width of 16 feet.

The Project will also require the construction of a joint collector system and interconnection substation as well as a maintenance building. The collector and interconnection substations will be located immediately to the north of the PSNH L163 line that passes through property leased by Antrim Wind. The final design of the interconnection substation will be performed by PSNH but will be located within the footprint shown on civil design plans (provided in Appendix 7A of this Application) and will be contained within the permitted footprint and elevations contained in this Application. The maintenance building is expected to be approximately 3,000 square feet in size.

The proposed Project layout is illustrated on Figure E.3.

Figure E.3: Facility Size and Configuration



E.4. The ability to increase the capacity of the facility in the future

At this time, Antrim Wind Energy, LLC does not anticipate increasing the capacity of the facility in the future.

E.5. Raw materials used

E.5.a. An inventory, including amounts and specifications

Wind energy projects do not require a significant amount of raw materials. The projects are primarily infrastructure projects consisting of road construction and the installation of pre-manufactured equipment (turbines, transformers and switchgear) including the associated electrical systems needed to deliver the generated electricity to the grid. The vast majority of raw materials used in the Antrim Wind Energy Project will be those used in the construction of foundations and the electrical collection system. A detailed inventory of raw material quantities and specifications will not be finalized until a Balance of Plant construction contract is bid and awarded. This will occur after the permitting process for the proposed project and once all the details for the site specific construction are finalized. For this reason, at this time, this Application is limited to a general discussion of the types of materials typically used to construct a wind facility.

Each Acciona turbine will consist of a nacelle, rotor hub, blades and a tower. Within the nacelle are the generator, gearbox and the primary electrical components of the turbine. The nacelle is installed on a tubular steel tower and is enclosed by an insulated, fiber reinforced, polyester skin covering a cast iron and steel frame that holds all of the turbine's internal components. The blades are made of wood, fiberglass, carbon-fiber reinforced plastic, and/or polyester-reinforced fiberglass. The blades are bolted to a nodular cast iron hub. The tower is made of structural steel bolted to a concrete and steel foundation. The electrical collector system consists of copper and/or aluminum wiring, transformers, switchgear, protection and control devices, above ground poles and below ground conduits. The road system will be constructed of rock and gravel with concrete or plastic (typically HDPE) culverts and drainage structures. The civil design for the roads within the project area is intended to create a balanced site meaning that fill material is not intended to be imported and excess material should not need to be exported. In some situations certain types of fill may need to be imported in limited quantities if insufficient amounts cannot be obtained from the site. Minimal amounts of bituminous pavement will be used on the access roadway from Route 9 to the interconnection substation.

The primary "raw" (or minimally manufactured) materials expected to be required for the Antrim Wind Energy Project include utility poles, PVC conduit, electrical cable, fiber optic cable, concrete, and steel rebar. Construction materials specific to the Operations & Maintenance ("O&M") building and substation will also be necessary. All of these materials are fairly common and will be readily available from local or regional suppliers.

E.5.b. A plan for procurement, describing sources and availability

Antrim Wind Energy, LLC will conduct a competitive bid process for a Balance of Plant ("BOP") contract for the construction of the Antrim Facility. Antrim Wind Energy will directly procure turbines for the facility and the BOP contractor will handle the remainder of the procurement. Antrim Wind Energy has solicited indicative quotes from numerous turbine manufactures and as of the date of this application assumes that Acciona Energy will be the supplier for the Project. Acciona turbines are currently competitive both from a power production standpoint and from a price per turbine perspective. Acciona's AW3000-116 turbine has a power curve that coincides well with the wind resource at the Antrim site and thus performs well from a financial perspective on a dollar megawatt-hour basis. However, current market conditions suggest that the turbine market is not supply constrained and therefore Antrim Wind Energy has elected to hold off on finalizing a turbine supply agreement for the Antrim Wind Project.

Acciona Energy currently manufactures the AW 3000 wind turbine nacelles and hubs in Navarra, Spain; however they do a have a manufacturing facility in West Branch, Iowa where they manufacture their 1.5 Megawatt machines. Acciona has plans to manufacture AW 3000's in Iowa, but the exact timing of this transition is unknown. It is reasonable to expect that for a project that anticipates a commercial operations date in mid to late 2014, turbines could be supplied from the Iowa facility. These logistics will be negotiated as part of the turbine supply agreement for the Project. The rest of the components, to be supplied by Acciona along with the turbine nacelles, include the blades and towers. Depending on the circumstances at the time these parts may be produced by Acciona or by one of their specialty subcontractors. As such, it is difficult to determine where these components will come from, but they will be included in the turbine supply agreement and procured through Acciona either directly or indirectly.

All other construction related materials will be procured through the BOP contractor for the project. The BOP contract will be competitively bid and a qualified and experienced contractor will be selected. The BOP contract will include a "local qualified contractor" clause to encourage the use of local labor. There is no guarantee that the BOP contractor and sub contractors will purchase materials locally. However, it is reasonable to expect that local suppliers will have a competitive price advantage due to transportation costs and logistics. Materials such as concrete that have "shelf lives" once mixed will most likely be sourced locally. Virtually none of the materials supplied by the BOP contractor or subcontractors are specialty or long lead-time items, so adhering to the contract construction schedule will be a key criteria in subcontractor selection. Antrim Wind does not view material supply as a concern relative to construction of the Antrim Wind Energy Project.

E.5.c. A description of the means of transporting

All components will be transported to the site via truck or other vehicle as described in Section F.5.e.

E.6. Production information

E.6.a. An inventory of products and waste streams

During construction, some waste materials are expected to be generated. Typically these are limited to packaging materials, lumber used for forms, and general trash generated by workers. AWE will contract with a waste disposal service during construction to insure proper handling and removal of waste materials.

During operation, the Project will not generate any air or water waste streams.

E.6.b. The quantities and specifications of hazardous materials

Each wind turbine generator will require various lubricating oils which are necessary for proper operation and maintenance. The approximate quantities of these materials, as required for operation of the Acciona AW-116/3000 wind turbine generator, are listed in Table E.6.b. These specifications may change slightly depending on final turbine selection, however, the specifications listed for the AW-116/3000 turbine are similar to those of other turbines available in the 3 MW class.

Table E.6.b: Oils and Lubricants Associated with the AW-116/3000 Wind Turbine Generator

OILS & LUBRCANTS ASSOCIATED WITH THE ACCIONA AW-116/3000			
Union	**Description**	**Manufacturer**	**Qty (L)**
Blade bearing; Yaw bearing	Shell Rhodina Grease BBZ	Shell	1.00
Low speed shaft bearing; Pitch cylinder spherical bearing	LGWM 1	SKF	107.10
Yaw bearing teeth	Ceplattyn BL	Fuchs	1.00
Generator bearing	Generator bearing grease	Beslux	1.00
Gearbox	Mobilgear SHC XMP 320	Mobil	610.00
Shrink disc coupling	Helix Ultra 5W 40	Shell	0.50
Shrink disc coupling	Pennzoil Ultra Euro 5W-40	Pennzoil	0.50
Main hydraulic unit (pitch)	Shell Telus T32	Shell	555.00
Secondary hydraulic unit (brakes and manual pump)	Shell Telus T32	Shell	37.00
TOTAL			**1313.10**

With the exception of some of the greases used for lubrication, the oils and lubricants listed in Table E.6.b are contained within the Acciona wind turbine generator. The AW-116/3000 is designed such that if a leak were to occur within the nacelle, liquids will flow into a contained drainage system which ultimately delivers all spilled materials into a 50 gallon drum located in the base of the tower. These materials will be managed in accordance with a Spill Prevention, Control and Countermeasure ("SPCC") plan, as further described, below.

In general, other hazardous materials on the Project site will include: fluids (oils, fuel, etc.) associated with maintenance vehicles; on-site storage of portable fuel cans (for maintenance vehicles); oily rags and other waste associated with turbine lubrication and maintenance; and oils associated with substation components (e.g. transformers). Propane or heating oil may be associated with the Operations and Maintenance building, depending on final design plans for heating of this structure. Finally, the substation will include a backup generator that will require liquid fuel; specific fuel type will depend on final design, but is expected to be propane.

<u>Spill Prevention, Control and Countermeasure ("SPCC") Plan</u>

In order to manage hazardous substances in accordance with federal regulations, AWE will prepare an Operations SPCC plan prior to the commencement of commercial operation. The Operations SPCC plan will describe the procedures, methods and equipment that will be used at the facility to comply with the U.S. Environmental Protection Agency's ("USEPA") oil spill prevention, control, and countermeasures standards. Likewise, the SPCC plan will comply with federal inspection, reporting, training and record keeping requirements.

An example of the anticipated Construction SPCC Plan for the Antrim Wind Energy Project is provided in Appendix 4 of this Application.

E.6.c. Waste management plans

During construction, AWE will contract with a waste disposal service to insure proper handling and removal of solid waste and construction debris. Any waste generated during construction will be transported and disposed of by licensed contractors. During construction, the facility's Construction SPCC plan (described above) will direct waste management and ensure compliance with USEPA regulations.

During operation, the facility's Operations SPCC plan (described above) will direct waste management and ensure compliance with USEPA regulations. Any wastewater associated with restroom facilities at the proposed O&M building will be routed through a septic and leach field system approved by NHDES (see Appendix 2F).

F. RENEWABLE ENERGY FACILITY INFORMATION

F.1. Make, model and manufacturer of the unit

The proposed Project will use wind turbines with horizontal axis upwind rotors, typical of those currently in use in utility scale wind projects in New England. Antrim Wind Energy, LLC is presently evaluating turbines manufactured by a number of manufacturers. Final turbine selection will be based on several factors, including availability, price and site suitability. For purposes of this Application, Antrim Wind has studied and provided a description of the largest unit that is currently under consideration, the AW-116/3000 turbine manufactured by Acciona Energy, a wind turbine manufacturer with plants in Spain and the United States. Compared to commercially available turbines in the 3 MW size class the AW-116/3000 represents the "largest scale" option in terms of size, height, visibility, noise and other factors assessed within this Application.

The Acciona AW-116/3000 turbine has a nominal power rating of 3 MW (3000 kW). The rotor diameter is 116m. The hub height is 92.5 meters. The nacelle is constructed of fiberglass and reinforced polyester. Details on the Acciona AW-116/3000 turbine are provided in Appendix 5.

F.2. Capacity in megawatts, as designed and as intended for operation

The total nameplate capacity of the Antrim Wind Energy Project will depend on final turbine selection, but is expected to be 30 MW.

F.3. Type of unit, including

As discussed above, the specific type of unit for installation at the proposed Antrim Wind Energy Project is still under consideration. The largest unit under consideration is the 3 MW Acciona AW-116/3000. Details on the Acciona AW-116/3000 turbine are provided in Appendix 5.

F.3.a. Fuel utilized

Not Applicable. The Project's generator units, regardless of make and model, will be powered by wind.

F.3.b. Method of cooling condenser discharge

Not Applicable. The AW-116/3000 WTG is equipped with an intercooler fan attached to the gearbox. The generator is cooled by forced ventilation from fans that exhaust warm nacelle air to the outside of the WTG; this increases the heat exchange within the WTG. This cooling system does not use or discharge water, and has not been known to cause condensation. If any condensation were to occur, it would be minimal and would evaporate quickly.

F.3.c. Whether the unit will serve base, intermediate or peaking loads

Power output from wind facilities is subject to weather conditions, and is therefore inherently intermittent. For this reason, wind facilities are not considered a continuous contributor to base loads, nor can they be called upon for instantaneous operation to serve peaking loads. By definition, wind facilities are categorized as "intermediate"; serving to fill gaps between base and peak production. More accurately, the proposed facility will operate opportunistically as weather conditions allow, and will supply power to the grid as it is produced. Wind facilities are considered to be effective as intermediate sources and can help to reduce the need for fossil fuel or overuse of peaking plants during heavy demand days. (MASS AREA 2008, NY AREA 2008).

F.3.d. Unit efficiency

The design and efficiency of a wind energy generation facility is dependent upon a variety of interrelated factors including terrain elevation and landcover, wind speed and direction, and the rated capacity and power curve of a given wind turbine generator. Among these factors, the characteristics of the wind resource are the most difficult to quantify. Wind resource components such as wind speed, direction, turbulence intensity, and shear are assessed through the deployment of meteorological monitoring equipment and analyzed through the application of complex modeling software. Analysis of a site's wind resource needs to be representative of the entire turbine array and it is often necessary to sample the wind resource at various locations throughout the project's extents. Once the wind resource profile has been studied for at least one year it is possible to generate a site layout that optimizes the position of turbines in relation to the wind resource, other turbines within the array, and additional development constraints. With meteorological measurements ongoing, adjustments to the turbine layout are made to ensure the maximum energy efficiency of the project. In order to account for interannual variability in the wind resource, the on-site data is correlated with long-term reference stations and adjusted according to historic trends.

Antrim Wind Energy has been collecting on-site wind data with a 60 meter meteorological tower since 2009. Additional wind resource measurement is being accomplished through the application of remote sensing technology. Specifically, the Project is utilizing a LiDAR (Light Detection and Ranging) device to sample portions of the array that are not as proximal to the meteorological tower. The LiDAR also provides the capability to measure wind characteristics at heights representative of the full turbine rotor sweep, well beyond that which can be achieved through traditional meteorological towers. Through a combination of repeatedly correlating the LiDAR data with the meteorological mast and deploying it as a roving device, the LiDAR is contributing to a robust measurement campaign designed to maximize accuracy and minimize uncertainty.

Based on the sophisticated on-site wind resource measurement campaign, correlation with long-term reference stations, and the application of state of the art analysis methods, AWE is confident that the site offers a competitive wind resource. Throughout the iterative process of diligence and design, AWE has evaluated a variety of turbine models suitable for the wind resource regime. Because the Project is located in an area that is constrained by available land (e.g. other adjacent land that may otherwise be suitable for wind energy purposes has conservation restrictions, or is too close to residences), AWE considered only turbines in the 2.5 – 3 MW size class in order to achieve sufficient economies of scale and maximize output capacity. Within this size class, AWE has generally focused on turbines with larger rotor diameters, to maximize energy yields from each turbine. In the interest of achieving maximum efficiency for the facility, the Project has chosen to evaluate the Acciona AW-116/3000 for the purposes of this application. The AW-116 offers impressive power curve performance, array efficiency, and reliability. While a binding turbine supply agreement has not yet been executed, AWE maintains excellent relationships with several turbine manufacturers and believes there are several turbine models in the 3 MW size class that would perform well at the Project site. Performance aside, AWE concluded that the Acciona turbine represents the most appropriate turbine for this Application submission due to the fact that the AW-116's overall size, civil design requirements and other measureable impacts are as large or larger than any other wind turbines that may be finally selected for the Project.

Turbine and wind plant energy yield are measured both in gross capacity factor and net capacity factor. A project would have a gross capacity factor of 100% if it were producing 100% of its rated capacity for all 8760 hours of each year. No energy plant has a 100% gross capacity factor. Items affecting gross capacity factor include, the availability of the wind resource, planned and unplanned maintenance and the potential for operational curtailment for any reason. Factors affecting net capacity factor include blade soiling, icing, electrical losses in transformation, collection and transmission, and consumption of power for onsite operations. Accounting for all losses, Antrim Wind estimates that the Project will have an average annual net capacity factor of 37.5 – 40.5%. Based on this projected capacity factor, the Project is expected to produce between approximately 98,300 and 106,645 Megawatt hours (MWh) of electricity per year. The Project is anticipated to produce enough electricity for the average annual consumption of between 13,000 and 14,000 New Hampshire homes. This estimate is based on data from a 2009 report issued by the Department of Energy, Energy Information Administration, which indicates that electricity usage per year for the average New Hampshire home is 7,584 kilowatt hours (kWh).

F.3.e. Impact on system stability and reliability

A System Impact Study Agreement was entered into in September 2011 by Antrim Wind Energy LLC, ISO-New England ("ISO-NE"), and Northeast Utilities Service Company ("NUSCO"), on behalf of PSNH, and the study is currently in progress. This study is being performed in two discrete sequential steps: a Feasibility Study and a System Impact Study. The report from the Feasibility Study component is expected to be issued by mid March 2012. This Feasibility Study will examine steady state voltage, facility capability and short circuit issues to verify the Project does not adversely impact the PSNH system or other components of the regional transmission system. A copy of the Feasibility Study will be forwarded to Site Evaluation Committee upon completion. Appendix 6 has been reserved for this purpose.

Following completion of the Feasibility Study, the Project will authorize the System Impact Study component to proceed, which will model and assess any possible stability issues that may result from adding power from the Project to the PSNH transmission system in order to verify that the Project does not adversely impact the PSNH system or other components of the regional transmission system. The purpose of the System Impact Study is to determine the specific interconnection requirements to ensure the Project does not cause adverse impacts on the system stability and reliability of the electric grid. This study is a standard portion of the interconnection process, and the study results will be reviewed by NUSCO, PSNH and ISO-NE. In addition, if deemed necessary, the study results will be reviewed by a larger peer group of New England utilities that review the results of each interconnection study performed within the New England region, with the directive to ensure the Project will not create adverse impacts on system stability and reliability. The Project will be required to comply with all study recommendations to ensure there are no adverse impacts on system stability and reliability. A copy of the final System Impact Study is expected in May or June 2012 and will be provided to the Site Evaluation Committee. Appendix 6 has been reserved for this purpose.

Once the System Impact Study has been fully reviewed and completed, the Project will enter into a Large Generator Interconnection Agreement (LGIA). The LGIA will document all the requirements the Project must follow to be allowed to interconnect with the region's electric grid. Only after completion of these requirements to the satisfaction of NUSCO, PSNH and ISO-NE will the Project be allowed to interconnect, thus ensuring the Project will not adversely impact system stability and reliability.

F.4. Any associated new substations and transmission lines

The Project proposes to interconnect to the existing PSNH L-163 115kV electric transmission line via a new substation located on property that is currently leased by Antrim Wind Energy, LLC. No new electric transmission lines, other than Project electrical collector system lines, are currently anticipated to be required. An underground electrical collection system will transfer the electricity generated by the turbines to the substation.

The Project substation will serve to deliver generated power from the wind turbines to the grid. The substation yard will be divided into two areas; one for collection and one for interconnection. The collection yard will be 100 feet by 111 feet and will contain a transformer and a 16-foot by 12-foot control house. The yard will be surrounded by a chain link fence topped with barbed wire. There will be a gate at the west side of the yard and a gate at the north side of the yard. Directly adjacent to (and sharing a fence line with) the collection yard, there will be an interconnection yard; this area will be 172 feet by 186 feet, and will contain a three-breaker ring bus. A 20-foot by 24-foot control house will be located in the northwest corner of the interconnection yard. This yard will also be surrounded by a chain link fence topped with barbed wire. There will be two gates on the west side of the interconnection yard. The yard surface of both areas will be comprised of gravel/crushed stone. Substation design drawings are provided in Appendix 7B of this Application.

F.5. Construction schedule, including start date and scheduled completion date

Construction of the Antrim Wind Project will begin after all required approvals and permits have been obtained and all commercial agreements are finalized. Construction is currently planned to start in the summer of 2013, but will ultimately depend on when a final, non-appealable certificate of site and facility is obtained. Depending on winter weather and other seasonal conditions, the expected Commercial Operation Date is September 2014.

Antrim Wind Energy, LLC has engaged Reed & Reed, Inc. from Woolwich, Maine to provide a constructability analysis, cost estimating, Project scheduling and other construction related advisory services given their extensive experience with New England wind project construction. Reed & Reed is arguably the most experienced Wind Power contractor in the northeast, having constructed 473 MW of wind energy projects on challenging mountainous terrain. Reed & Reed constructed the following projects.

- Mars Hill, Maine 42 MW
- Lempster, NH 24 MW
- Stetson Mt., Maine 57 MW
- Freedom, Maine 5 MW
- Kibby, Maine 132 MW
- Berkshire, Mass 15 MW
- Stetson II, Maine 26 MW
- Rollins Mt., Maine 60 MW
- Record Hill, Maine 50 MW
- Kingdom Wind, VT 63 MW

A Project schedule has been established to outline key milestone dates and facilitate coordination of equipment deliveries toward completion of the Antrim Wind Project. This Project schedule will be maintained by Antrim Wind Energy, LLC in conjunction with Reed & Reed in order to reflect monthly changes in development status, scheduled deliveries of major equipment, and the availability of materials and labor resources based on weather and other factors. The Project-specific activities and the anticipated timeframe for each have been evaluated to create the Project schedule. The Project schedule for the proposed Antrim Wind Project is attached in Appendix 7D.

F.5.a. Construction process

As explained elsewhere in this Application Antrim Wind Energy, LLC is a joint venture between Eolian Renewable Energy, LLC and Westerly Wind, LLC. Eolian is actively developing numerous projects across New England and Westerly is actively developing numerous projects across the U.S. The principals of Westerly Wind have collectively developed over 700 megawatts of wind energy projects in the U.S. and worked with some of the leading contractors active in wind farm construction. Following a competitive bidding process, AWE will award a BOP contract to the most qualified contractor. Antrim Wind Energy LLC's level of experience and technical depth will be supported by the experience of a qualified and experienced professional general contractor utilizing only the most knowledgeable and professional specialty subcontractors.

Using all of the data gathered for the Project (including geographic information, environmental conditions, site topography, etc.), AWE has worked with several engineering firms and consultants to develop a set of site-specific construction specifications for the various components of the Project. The design specifications comply with construction standards established by various professional industry groups, including:

- American Concrete Institute (ACI)
- Institute for Electrical and Electronic Engineers (IEEE)
- National Electric Code (NEC)
- National Fire Protection Agency (NFPA)
- Construction Standards Institute (CSI)

The Project's engineering team will ensure that all aspects of the specifications, as well as the actual on-site construction, comply with all applicable federal and state codes and standard industry practices. The Project developer and contractor will coordinate directly with the code enforcement officers in order to assure that all Project inspections are properly overseen.

<u>Initial field work</u>

The initial field work during equipment mobilization includes surveying and site flagging to establish clearing areas, buffer zones and non disturbance areas. Flagging will be done using survey grade Global Positioning Systems (GPS) that will guide subsequent logging and excavation. This will prevent inadvertent over-clearing and minimize the extent of tree removal. A qualified logging company will clear and remove trees where necessary, to remove the vegetation which will allow site work to proceed. Initial road construction will begin as soon as sufficient areas have been cleared to enable drilling and excavation equipment to maneuver around the site.

Clearing and grading

A construction staging area will be developed in the vicinity of the operations building and substation area by stripping and stockpiling the topsoil, and grading and compacting the subsoil. A minimum of 8 inches of gravel will then be installed to create a level working yard. If there is a soil base, geotextile fabric may be used below the gravel. Electric and communication lines will be brought in from existing distribution poles to allow connection with construction trailers. At the end of construction, utilities, gravel, and any geotextile fabric will be removed (from staging areas that do not overlap with the proposed operations and maintenance facility) and the sites restored to their preconstruction condition.

In order to clear the construction area so that the land can be worked, vegetation is removed along the roads, collector system, and around turbine locations. For transport roadways, clearing is typically done to establish an approximately 30-foot corridor centered on the road alignment. Where the collection system is overhead and adjacent to the transport roadway, an approximately 40-foot corridor will be cleared to allow for the installation of poles and wire next to the road. For crane roads, an approximately 50-foot corridor is needed. Following the initial timber harvesting, additional clearing will be done by mechanical means, using heavy equipment to remove debris in the corridors so that the area is ready for drilling, blasting, excavation and earthwork activities. All marketable timber will be sold, and smaller diameter trees and brush will be chipped and used on site for re-vegetation and soil stabilization. Topsoils will be stockpiled and then used during re-vegetation, so that native, site soils organic matter and seeds are kept on the site.

Areas surrounding the turbine locations will be cleared of trees and graded to a near level surface to create a laydown area that will allow for construction of the foundation, crane pads and turbine erection. This work will require clearing of approximately one acre per turbine site.

Due to the shallow topsoil that typically exists in higher elevations of New England, many areas of the Project site will require blasting in order to construct roads and foundations. Blasting is done in strict conformance with a Project blasting plan, which will be provided to the Town of Antrim, and which will be reviewed and approved by the New Hampshire Department of Safety (NHDOS) for compliance with explosives storage regulations. Blasting will be conducted by a licensed contractor that offer experience and complete qualifications. Typical blasting plan provisions include advance notification through area newspapers and notices posted at the Town Hall. All blasting plans require a detailed site control plan to ensure that only licensed workers are in the vicinity, and to document safety and control measures tailored to the site. These measures include warning signs, warning sounds (air blasts), and physical site control, including in wooded areas, for an appropriate diameter around each blast site.

Grading and drainage

As part of the site design, the Applicant's civil engineer, TRC, has produced a grading and drainage plan with details on approved construction measures and best management practices for controlling storm water and drainage for the site. A storm water pollution prevention plan will be prepared for this Project and submitted for review and approval with the NHDES and maintained onsite. Culverts will be installed per the design plans as part of the road construction to maintain or improve the drainage of the area without increasing erosion of topsoil. Culverts, level spreaders and additional retention areas that are needed based on the Project's impacts will be maintained during operations in accordance with state requirements. Antrim Wind has consulted with NHDES, and the USACE on site-specific drainage and stormwater control measures. During construction, the Project will install and maintain temporary sediment and stormwater control devices, as required by NHDES, such as silt fences, hay bales, wood chips, swales, and/or water bars. After turbine erection is completed, the Project will re-seed and restore non roadway areas to ensure that exposed soils are not subject to erosion.

Road construction

In general, road construction starts with topsoil stripping and the grubbing of stumps and organic material. Stripped topsoil will be stockpiled along the road corridor for use in site restoration. Any grubbed stumps will be removed, chipped/ground, or buried. Roads will be constructed by grading and compacting to the depth necessary to meet the specifications required for construction equipment. In many areas, excavation or fill will be required so that the road can meet design parameters. In fill areas with a soil base a permeable, geotechnical fabric that acts as a sediment barrier between the rock and soil, may be placed over the compacted area. Gravel is then spread to accommodate the required roadway width and further compacted to provide a permanent gravel road. Typical gravel depths vary from 8 to 12 inches. Drainage ditches, swales, culverts, and appropriate sediment and erosion control measures (e.g., silt fencing) will be installed in the locations where access roads are adjacent to, or cross wetlands or streams. Culvert designs have been coordinated with NHDES and USACE. Upkeep and maintenance will be performed, as needed, so that site access is maintained throughout the year.

For the Antrim Wind Energy Project a new access road will be constructed starting from Route 9 and extending to the southwest throughout the Project area. The access road has been designed in order to minimize impacts resulting from clearing as well as to avoid impacts to wetlands and watercourses to the greatest extent possible. The access road will extend from Route 9 south to the substation/staging area just north of the PSNH utility corridor; it will then proceed under the PSNH transmission lines heading south and then west to Turbine 1. The access road leading to the first turbine will be gravel and approximately 16 feet wide. Sections north of the new substation location steeper than a 10% grade will be paved to meet PSNH's requirements. The roadway beyond the first turbine will be gravel and, during the construction period, this crane path will be approximately 34 feet wide to accommodate movement of the heavy-lift turbine erection crane, which has a track width of approximately 32 feet. In numerous locations along the crane path the areas of disturbance will be wider than the road width to accommodate excavations and fills to achieve design grades and to allow for delivery truck turning radii. After completion of turbine erection, those portions of the roads that are wider than necessary for two-way traffic will be reduced to approximately 16 feet in width and the reclaimed shoulder areas will be restored and reseeded using approved New Hampshire native seed mixes. AWE will maintain these roads year-round, including plowing, sanding, and grading as necessary. Typically snow plowing will contracted with a local vendor.

Turbine foundation construction

The start of turbine foundation construction is expected to occur after the majority of blasting is completed on the crane path and WTG work pads. Foundation construction occurs in several stages including excavation, installation of leveling slabs, rock anchor installation, outer form setting, rebar and bolt cage assembly, casting and finishing of the concrete, backfilling, tensioning of the bolts and finally site restoration. Similar to other New Hampshire wind projects like Lempster, rock anchor foundations will be utilized due to the shallow depth of bedrock along the ridgelines where the turbines will be located. Excavation and foundation construction will be conducted so as to minimize the size and duration of exposed excavated areas. Rock anchor foundations will require an excavation approximately eight (8) feet in depth and thirty-five (35) feet in diameter. Rock anchor foundations consist of a concrete and rebar cap that is secured to rock in the subgrade by 18 to 24 steel anchor bolts. The site is excavated and a level work surface is poured at the bottom of the excavation so holes can be drilled to a depth of 40 to 50 feet below grade for rock anchor installation and grouting. The structural cap of the foundations is then constructed using concrete and steel. The finished concrete foundation will be approximately 24 feet in diameter. The cap consists of approximately 130 cubic yards of concrete, rebar and the bolt cage which connects the tower to the foundation. The rock anchors are grouted and tensioned, securing the cap to the rock below. Rock anchor foundations require maintenance to ensure that the rock anchor bolts are properly tensioned to the rock. Typically this is checked after installation of the turbine, at three months after completion of the Project and every two years through the life of the Project.

Rock anchor foundations use considerably less concrete than traditional spread-footing foundations and have a significantly smaller footprint. However should site-specific geotechnical conditions warrant, some spread footing foundations may be required. Spread footings require an excavation to a ten (10) foot depth and seventy (70) foot diameter. Following excavation, the foundation is formed and reinforcing steel and anchor bolts are installed prior to pouring concrete. The finished concrete foundation will be approximately 60 feet in diameter for a spread footing foundation.

In all instances, once the foundation concrete is sufficiently cured, the excavated area around the foundation will be backfilled and graded with the excavated on-site material. The tower is secured directly to the top of the foundation and the nominal 20 foot diameter pedestal cap that typically extends 6 to 12 inches above grade. The finished grade around the foundation pedestal and base of the tower will be surfaced with a graveled area approximately six (6) feet in width that covers the wider subsurface structure.

Crane pads

Crane pads will be installed adjacent to each turbine foundation to provide the main erection crane a stable, well-compacted, level base from which to accomplish heavy lifting. Crane pad dimensions are typically 60 feet wide and 90 feet long. A crane pad is constructed in a manner similar to the construction of access roads. Trees, vegetation, and compressible, organic soils and topsoil are removed as part of initial site preparation. Following the initial site preparation, geotechnical filter fabric is installed if necessary, followed by successive layers (8 to 12 inches) of well compacted crushed aggregate. After the initial construction phase, the crane pads will only be used periodically during the operations phase of the facility. Nevertheless, leaving the crane pads intact will facilitate future operations and maintenance activities. Such activities could include replacement of a blade, maintenance tasks and equipment replacement, and post-construction environmental monitoring, which are facilitated by cleared areas around turbines.

Removal and disposal of construction debris

Debris will be removed from the site during construction by a local hauling company through the Project's general contractor. Typically, sites do not produce large amounts of waste during construction. Due to cut and fill methods and foundation excavation, some spoil piles may be made on site. In those instances, all spoil material will be natural to the site and provisions will be made for large organic material (such as stumps and logs) to be ground and used on site. These areas will be re-vegetated with native mix at the conclusion of Project construction.

Post construction and reclamation

At the conclusion of Project, the areas that have been cleared and do not contain a permanent structure will be re-vegetated with native mix. This helps to reduce erosion and promotes the site's natural condition. Restored areas will include road edges, crane paths, temporary roads, and staging areas. This process will generally involve the following sequence of activities:

- Seeding with a native mix and mulching all rock WTG work pads.
- Spreading organics and seed with native mix at the edges of access road and crane paths to reduce widths to 16'.
- Restoring all construction lay down areas.

At the conclusion of construction and restoration, silt fences and temporary sediment and erosion control measures will be removed as necessary, in accordance with all applicable permit conditions.

F.5.b. Substation, switchyard, staging area, and operation & maintenance building

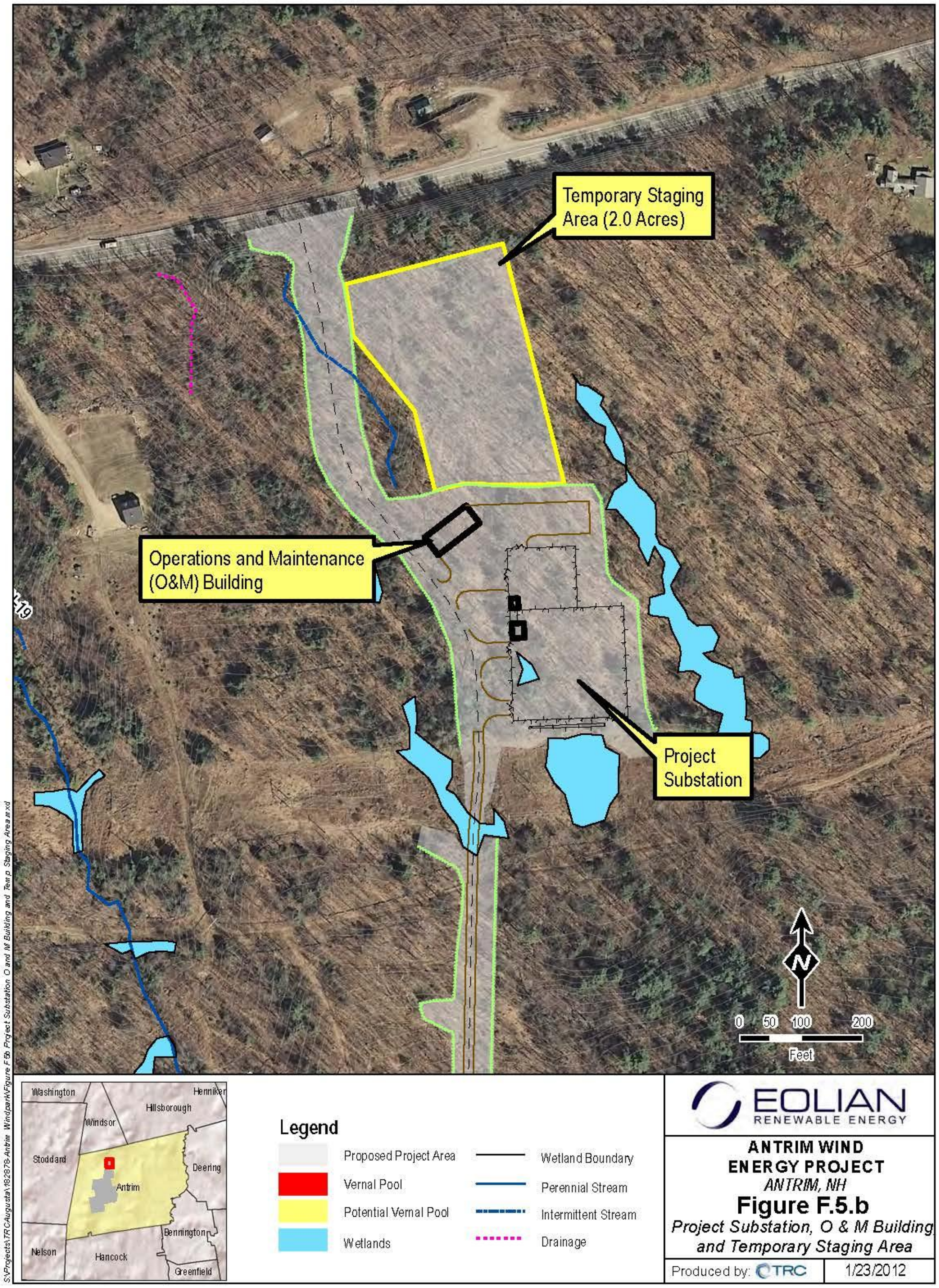
A collection switchyard and substation will be located adjacent to the PSNH transmission corridor, and will be the terminus of the Project's electrical collector system. The switchyard and substation will include transformers, switching equipment, protective relay and control equipment, transfer trip equipment, disturbance analyzer equipment, transducers, a Remote Terminal Unit, telemetry equipment and meters. In addition, a grounding bank will be installed, in accordance with utility and National Electric Code standards. Dedicated phone and data lines will be included, for data and communications between local utility facilities, and Antrim Wind's contracted SCADA monitoring service. The substation and switchyard will be enclosed within a fenced area as detailed in Appendix 7B.

The Project will require a temporary staging area to serve as an on-site construction headquarters. The proposed staging area is located in an upland area between Route 9 and the Project substation and will be approximately 2 acres in size. The area will house the Project construction office trailers and parking, and will serve as a receiving and storage area prior to use on the Project. Currently this site is forested, and will need to be cleared and graded. Topsoil will be stripped and stockpiled for use during restoration of the site; geotextile fabric will be installed and topped with a layer of 12 to 16 inches of well-draining gravel. Temporary erosion control measures will be implemented to prevent erosion and sedimentation. After construction is completed, debris, unused material, the gravel, and the geotextile fabric will be removed and the stockpiled topsoil will be replaced. The area will be stabilized and seeded using approved native New Hampshire seed mixes, and the site will then be allowed to re-vegetate with native plant species.

An O&M facility will be constructed in the Project area on the location shown in the civil design drawings (provided in Appendix 7A). This location provides for easy access to the site by operations personnel, as well as for access by utility personnel to the switchyard. The O&M facility will also provide additional construction office, material storage, and staging areas during construction. The O&M facility will be comprised of a single story building suitable for operating personnel, operations and communication equipment, parts storage and maintenance activities. A vehicle parking area will be located in close proximity to the building. There will also be an area for outdoor storage of larger materials and equipment.

The O&M building will be constructed in accordance with the design drawings contained in Appendix 7C. It will comprise approximately 3,000 square feet and will include offices and associated facilities (bathrooms, kitchen, storage) for technicians, a garage for spare parts and supplies, and a computer server room. The O&M building is expected to have a potable water well, sewage tank and leach field, hot water heater, HVAC, plumbing, electrical, computer, fiber optic, and telephone connections, and will be alarmed for fire, heat, and intrusion, in cooperation with local fire departments.

Figure F.5b: O & M Building and Temporary Staging Area



F.5.c. Turbine installation

In addition to the tower sections, nacelle, rotor, and blades, other smaller wind turbine components include: hubs, nose cones, cabling, control panels and internal facilities such as lighting, ladders, etc. All turbine components will be delivered to the Project site on flatbed transport trucks, and the main components will be off-loaded at each individual turbine site. Turbine erection is performed in multiple stages including erection of the tower sections, erection of the nacelle, assembly and erection of the rotor, connection and termination of the internal cables, and inspection and testing of the electrical system prior to energization.

Turbine assembly and erection mainly involves the use of large track mounted cranes, smaller rough terrain cranes, boom trucks, and rough terrain fork-lifts for loading and off-loading materials. The tower sections, rotor components, and nacelle for each turbine are delivered to each site by flatbed trucks and unloaded by crane. A large erection crane will set the tower segments on the foundation, place the nacelle on top of the tower, and, after ground assembly, place the rotor onto the nacelle. In some turbine locations, due to space limitations, single blade erection may be required, whereby the hub is installed and then each of the three blades is individually hoisted and attached. The erection crane will move from one tower to another along the crane path.

F.5.d. Collection system installation

A single 34.5 kV three phase collector line will be constructed from the collector substation to the individual turbines. The main collection line will follow the access road, with each turbine connected to the main line via an underground connection. The main collection line will consist of both underground and overhead lines. Underground lines will be installed from WTG-10 to just east of the WTG-2 &3 spur road. From there, the collection line will be installed on overhead lines running adjacent to the access road, along its east side. The overhead portions of the collection line have been designed to meet Avian Power Line Interaction Committee (APLIC) guidelines to minimize potential impacts to wildlife (APLIC and USFWS 2005). Where the access road intersects the PSNH transmission line corridor, the collection line will be installed underground to the collector substation. The electrical collection system is shown on the civil design drawings, which are provided in Appendix 7A of this Application

<u>Underground Collection Lines</u>

The individual turbines will be connected to a 34.5 kilovolt (kV) collection system to form an integrated power collection system. The turbines operate in parallel. Each turbine is connected to a 12,700-34,500 Volt Generator Step-Up (GSU) transformer and connection cabinet.

The installation of the underground collection system, including the accompanying fiber optic communications cable and plant grounding system, will be completed in accordance with prudent construction practices and in accordance with the contract specifications, drawings, and applicable industry standards.

Trenches for electrical cables and fiber optic cables will be installed on one side of the roads. The trench is typically excavated to a depth of approximately 4 feet (minimum depth for concrete encased conduit is 38"; direct bury conduit minimum depth is 54") with a minimum of at least 6 inches of clean sand fill is used to line the trench bottom. After the cables are installed, another 6 inches of clean sand (minimum) tops the cable. The remainder of the trench is backfilled with native soil.

The installed location and depth of the cables are verified and recorded. Utility markers are placed on each side of roadway crossings and at pipeline, telephone and communication easements. For continuous trench installations greater than 1000 feet in length, a marker is placed every 1000 feet or as shown on construction detail drawings.

<u>Overhead Collection Lines</u>

The underground collection system transitions to an overhead collection system from WTG 1 down to the PSNH transmission corridor. The overhead collection lines run adjacent to the access road and have been designed to meet APLIC guidelines in order to minimize impacts to wildlife. The overhead collection lines will be supported by approximately 32 wooden poles that are 35 feet high, with medium voltage spacer cable, and an optical ground wire for grounding and fiber optic communications. The poles will be freestanding except at some turns where guying will be used.

F.5.e. Heavy/oversize trucking loads

Heavy/oversized trucking loads will follow routes approved by the NHDOT, and will be accomplished by licensed haulers experienced in wind turbine component transport. Typically, haulers perform route surveys and propose route(s) to NHDOT, which then confirms and/or modifies the routes prior to issuing permits to the haulers. The permits identify the days of the week and hours of the day when hauling may occur. Typically there are multiple escort vehicles, including State Police, private oversized-load escorts, and county and/or local police as well.

For the Antrim Project, there are 10 proposed turbines. Since each turbine is composed of 4 tower sections, 1 nacelle, and 3 blades, it is anticipated that there will be a total of 80 oversized loads delivered to the site. The identified likely transport route is not expected to cause undue delays or disruptions along local roads. No local roads will be used. There are very few exits or turns for the Antrim transport route, namely an exit from I-89, and a single turn from Route 9. No improvements or modifications to roads are anticipated as the result of this Project. During construction, Antrim Wind will retain a New Hampshire registered Professional Engineer from a local firm to assess road conditions prior to and after all component delivery.

F.6. Decommissioning

Modern wind turbine generators typically have a certified life expectancy of 20 to 25 years. The current trend in the wind energy industry has been to replace or “re-power” older wind energy projects by upgrading older equipment with more efficient turbines. However, if the turbines are non-operational for more than a year, and they are not upgraded or replaced at that time, they will be decommissioned.

Decommissioning will consist of the following activities:

1. Provide decommissioning schedule to Town of Antrim prior to initiating any decommissioning activities.
2. Acquire approvals for transport of oversized/overweight loads from Project site. Coordinate with NHDOT prior to transport to confirm routes.
3. Re-establish access road and crane path widths to accommodate transport of equipment and components.
4. Mobilize crane(s) to the site and erect crane.
5. Drain fluids from gearboxes, transformers, and hydraulic systems and put into appropriate containers before tower dismantling. Transport and dispose of fluids in accordance with all state and federal regulations.
6. Dismantle and remove the rotor, nacelle and towers and transport entire Wind Turbine Generator off site to be recycled to the greatest extent possible.
7. Use an excavator to dig a trench around the perimeter of the foundation and dig an approximately 8-foot deep hole adjacent to each foundation to accept concrete rubble. Stockpile excavated material for use in re-grading.
8. Using an excavator equipped with a hydraulic ram/impact hammer or comparable equipment, remove the top 18 to 24 inches of the foundation in compliance with all applicable state and federal environmental regulations
9. All the metal and cable shall be cut off at the new, lower elevation of the foundation so that there is nothing left exposed above the concrete. The metal that is cut off will be separated and recycled.
10. Backfill excavation with the soil that was stockpiled and re-grade the foundation areas.
11. Remove all switchyard equipment from the site that is not owned by PSNH. Remove all fencing and concrete foundations to 18 inches below grade in the same manner as what is done for turbine foundations.
12. Areas where subsurface components are removed will be graded to match adjacent contours.
13. Loam and seed Project areas with an appropriate seed mix and allow to re-vegetate naturally in coordination with landowners’ wishes.

In addition to the above-described actions, the Applicant has offered an agreement to the Town of Antrim that contains provisions concerning decommissioning activities, including decommissioning funding assurance. A copy of this proposed agreement is contained in Appendix 17.

G. ELECTRICAL INTERCONNECTION LINE INFORMATION

The Project proposes to interconnect to the existing PSNH L-163 115 kV electric transmission line via a new substation located on property that is currently leased by Antrim Wind Energy, LLC. No new transmission lines are currently anticipated to be required. An electrical collection system will transfer the electricity generated by the turbines to the substation, which will be located immediately adjacent to the existing transmission corridor.

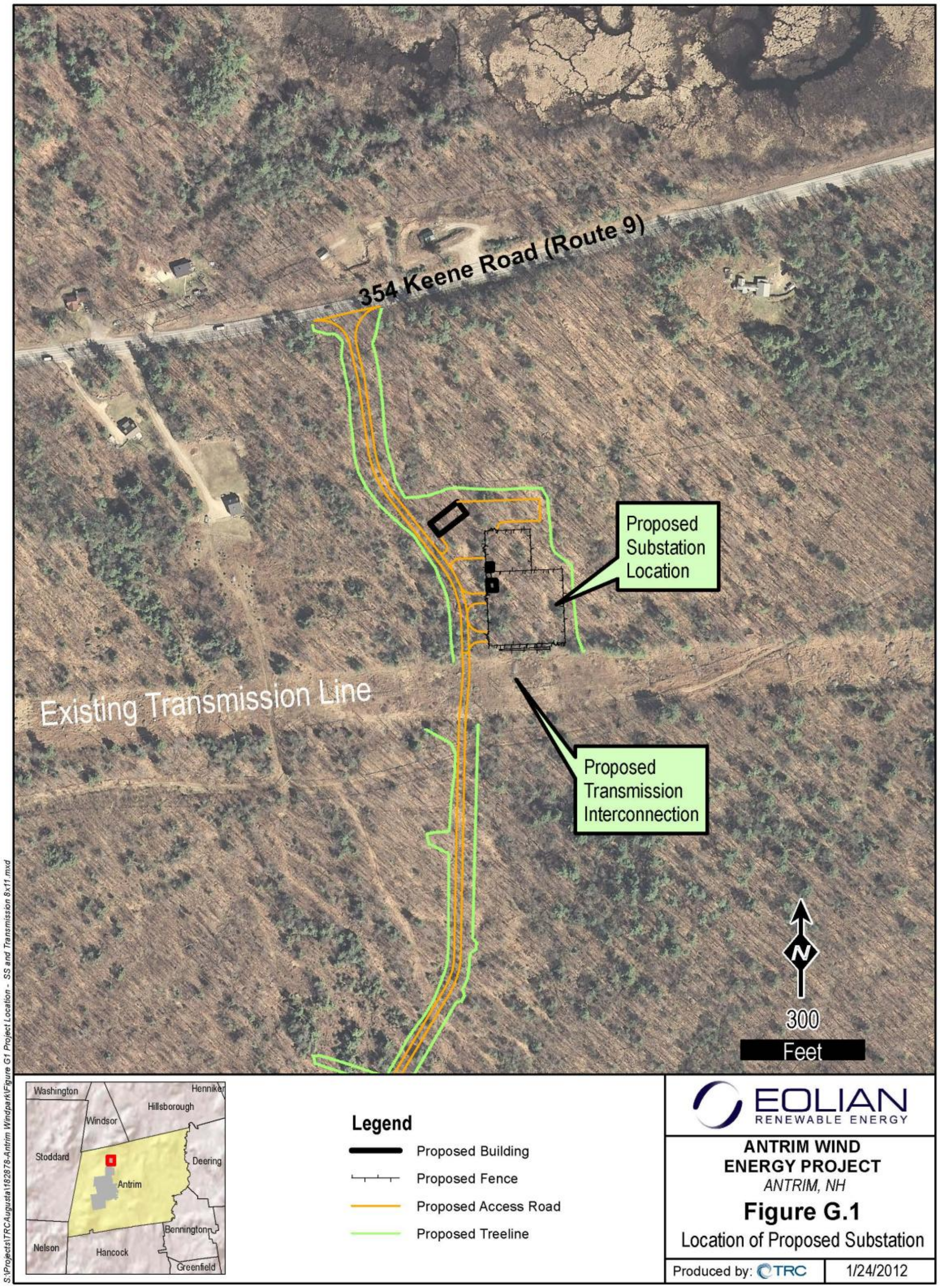
A single 34.5 kV three phase collector line will connect the collector substation to the individual turbines. The main collection line will follow the access road, with each turbine connected to the main line via an underground connection. The main collection line will consist of both underground and overhead lines. Underground lines will be installed from WTG 10 to just east of the WTG 2 and 3 spur road. From there, the collection line will be installed overhead on poles running adjacent to the access road, along its east side. Where the access road intersects the PSNH transmission line corridor, the collection line will be installed underground to the collector substation. The electrical collection system is shown on the civil design drawings, which are provided in Appendix 7A of this Application.

The Project substation will serve to deliver generated power from the wind turbines to the electric grid. The substation yard will be divided into two areas; one for collection and one for interconnection. The collection yard will be 100 feet by 111 feet and will contain a transformer and a 16-foot by 12-foot control house. The yard will be surrounded by chain link fence topped with barbed wire. There will be a gate at the west side of the yard and a gate at the north side of the yard. Directly adjacent to (and sharing a fence line with) the collection yard, there will be an interconnection yard; this area will be 172 feet by 186 feet, and will contain a three-breaker ring bus. A 20-foot by 24-foot control house will be located in the northwest corner of the interconnection yard. This yard will also be surrounded by a chain link fence topped with barbed wire. There will be two gates on the west side of the interconnection yard. The yard surface of both areas will be comprised of gravel/crushed stone. Substation design drawings are provided in Appendix 7B of this Application. The location of the proposed substation and transmission interconnection is illustrated on Figure G.1.

G.1. Location shown on U.S. Geological Survey Map

The location of the proposed Project is described in detail in Section C.1 and C.2 of this application. The location of the proposed substation and transmission interconnection is illustrated on Figure G.1.

Figure G.1: Location of Proposed Substation and Transmission



G.2. Corridor width for:

G.2.a. New route; or

Corridor width for a new transmission route is not applicable because the Antrim Wind Energy Project will not require new transmission development.

G.2.b. Widening along existing route

The Antrim Wind Energy Project will not require new transmission development. No widening of the existing transmission corridor is anticipated.

G.3. Length of line

The 34.5kV interconnection line from the proposed substation to the existing PSNH 115kV transmission will be approximately 150 feet long; the exact length will depend on the final PSNH substation design and exact interconnection location. There will be no new transmission lines associated with the proposed Project.

G.4. Distance along new route

The Antrim Wind Energy Project will not require development of a new transmission route.

G.5. Distance along existing route

The Antrim Wind Energy Project will not require the development of a new transmission line along an existing transmission route.

G.6. Voltage (design rating)

The Project will interconnect to PSNH 115 kV Line L163 between Jackman Substation and Keene Substation via a three breaker ring bus substation located adjacent to the Project access road. The interconnection substation will be a standard three phase 115 kV transmission level substation designed and constructed by PSNH. A 115 kV – 34.5 kV collector substation will be located adjacent to the interconnection substation and provide an interface between PSNH's facilities and the Project. The collector substation will be designed and constructed consistent with applicable industry standards, PSNH requirements, applicable local, state and federal codes and standard utility practices. A single 34.5 kV three phase collector line will be constructed from the collector substation to the individual turbines. This collector line will be a combination of overhead and underground facilities as described elsewhere in this Application. All collector system facilities (substation and lines) will be designed and constructed consistent with applicable industry standards, PSNH requirements, applicable local, state and federal codes and standard utility practices.

G.7. Any associated new generating unit or units

The proposed facility will consist of 10 wind turbine generating units in the 3 MW size class as described in Sections E.3, F.1 and F.3 of this Application. Details on the Acciona AW-116/3000 turbine are provided in Appendix 5.

G.8. Type of construction (described in detail)

The substation will be typical PSNH open air exposed bus construction with gas insulated breakers and/or vacuum breakers. The aerial collector line will be three phase, four wire, 34500/19920 volt single pole construction consistent with PSNH and utility industry standards.

G.9. Construction schedule, including start date and scheduled completion date

Interconnection substation construction is planned to commence concurrently with the construction of the Project and after the receipt of all necessary regulatory approvals. Construction is planned to start in the -summer of 2013, but will ultimately depend on when a final, non-appealable certificate of site and facility is obtained.

Collector line construction is planned to commence thereafter and be completed by September 2014, depending on weather. Inclement weather and/or winter ice storms that call for utility crews to respond could delay the construction schedule. Please see Appendix 7D for a complete proposed construction schedule.

G.10. Impact on system stability and reliability

The impact of the proposed Project on system stability and reliability is discussed in Section F.3.e of this Application. A complete System Impact Study report will be provided as soon as it is completed by ISO-NE.

H. ADDITIONAL INFORMATION

H.1. Description in detail of the type and size of each major part of the proposed facility

The proposed Antrim Wind Energy Project consists of the construction of 10 wind turbines, a collection and interconnection substation, approximately 4 miles of new access road, and an operations and maintenance building. There will be no new transmission lines, other than collector system lines, constructed as part of this Project. It is expected that the total direct impact for the access roads, the turbine pads, staging areas, and work pads will be approximately 57 acres. Each element of the Project is described in more detail below.

Access Road and Spur Roads

Approximately 4 miles of new gravel surface roads will be built for access, construction and maintenance of the wind turbines. The main access road will be approximately 3.47 miles (18,318 feet) long and will be built in two sections. The first section will connect Rte. 9 to wind turbine generator (WTG) #1; this section will be approximately 0.7 miles (3,710 feet) long and will be 34 feet wide during the construction phase of the Project, and ultimately 16 feet wide after construction is completed. The second section includes the remainder of the road, from WTG #1 to the ridge and then along the ridgeline. This section will be approximately 2.77 miles (14,608 feet) long and will be 34 feet wide during the construction phase. Once the Project is complete, the shoulder areas of this section of road will be restored and reseeded (using approved New Hampshire native seed mixes) to a final width of 16 feet. There will also be two spur roads installed to access individual turbines; one will be approximately 0.4 miles (2,127 feet) long and the other will be approximately 0.14 miles (765 feet) long. Like the main access road, these spur roads will be 34 feet wide during the construction phase, then restored and reseeded upon Project completion to a final width of 16 feet.

Substation

The Project will include an interconnection collector substation which will deliver power generated from the wind turbines to the grid. The substation yard will be divided into two areas; one for collection and one for interconnection. The collection yard will be 100 feet by 111 feet and will contain a transformer and a 16-foot by 12-foot control house. The yard will be surrounded by a chain link fence topped with barbed wire. There will be gates at the west and at the north sides of the yard. Directly adjacent to (and sharing a fence line with) the collection yard there will be an interconnection yard which will be 172 feet by 186 feet, and will contain a three-breaker ring bus. This yard will also be surrounded by a chain link fence topped with barbed wire. A 20-foot by 24-foot control house will be located in the northwest corner of this yard. There will be two gates on the west side of this yard.

Substation lighting will consist of both general yard lighting and specific task lighting, and will be designed in accordance with the Avian and Bat Protection Plan (“ABPP”), provided in Appendix 12F of this Application. Both general yard lighting and specific task lighting will be controlled manually and will be in use only during times of night maintenance. All lights will be shielded and downward-facing. The general yard lighting can also be set to be photo-or motion-controlled so that the yard is illuminated at night for security purposes should security concerns arise. The control house itself will have a photo-controlled light above the door. Substation drawings are provided in Appendix 7B of this Application.

Backup power for the substation will be provided by a propane-powered generator.

Public Service Company of New Hampshire requires that it own the land on which the interconnection yard is located. Thus, pursuant to the Committee's authority under RSA 162-H:16, II, the Applicant requests that the Committee approve the creation of a subdivided lot for the interconnection yard. Such approval is necessary to enable the Hillsborough County Register of Deeds to record a subdivision plat for the interconnection yard substantially similar to the plan contained in Appendix 7B. To accomplish that, such approval must provide that: (1) Antrim Wind Energy, LLC need not obtain any zoning relief or planning board site plan or subdivision approval from the Town of Antrim, and (2) a subdivision plat for the interconnection yard which is approved as part of the Committee's order and decision granting a certificate of site and facility is commensurate with the approvals required by RSA 676:18, and therefore can be recorded by the Hillsborough County Register of Deeds.

Operations and Maintenance (O&M) Building

The O&M building will be single story structure of approximately 3,000 sq. ft. It will house communication equipment, parts storage, and other maintenance supplies. Exterior lighting will be designed in accordance with the ABPP. Exterior lighting will be provided by shielded, manually-controlled fixtures which can also be photo-controlled.

Water for the O&M building will be supplied by a well drilled on site. Wastewater will be handled by an on-site septic system, which will be designed according to industry standards and subject to approval by the NHDES (Subsurface Systems Bureau).

A general design plan for the O&M building is provided in Appendix 7C of this Application.

Turbine Foundations, Staging Areas, and Work Pads

Turbine foundations are expected to be 20 feet in diameter and made of concrete. The exact dimensions of the turbine foundations will depend on which turbine is a chosen and site-specific conditions. It is expected that rock anchor foundations will be used where possible, due to the shallow depths of bedrock along the ridgeline. Final anchor design will be determined pending a geotechnical survey prior to construction. Gravel staging/assembly areas and crane pads will be installed adjacent to each turbine foundation. The staging areas will be approximately one acre. There will be a 34 foot wide crane path adjacent to the staging/assembly area that is also utilized for work space to some extent while assembling the crane. Staging/assembly areas will be reclaimed and reseeded with approved native New Hampshire seed mixes. Although primarily used during the construction phase, the crane pads will remain in place for periodic post-construction maintenance activities. WTG #1 and WTG #10 will have additional adjacent crane assembly pads of approximately 200-feet by 50-feet.

Wind Turbines

AWE is currently evaluating a number of different turbines from different manufacturers. Final turbine selection will be based on a number of factors, including price, availability, and site suitability. AWE plans to install 10 turbines, each with a generating capacity of 3 MW, for a total generating capacity of 30 MW (rated). The turbines will be installed on concrete foundations, which will be 20 feet in diameter. For the purposes of this application the Acciona AW-116/3000 turbine has been studied and will be described, as it represents the "largest scale" option in terms of size, height, diameter, visibility, noise, and other factors. Hub height for these turbines is 92.5 meters, and they have a nominal power rating of 3 MW. The turbine towers are made of tubular steel, on which the fiberglass and reinforced polyester nacelle is mounted. The rotor diameter is 116m. More information about the Acciona AW-116/3000 can be found at Appendix 5.

Electrical Collection System

A single 34.5 kV three phase collector line will be constructed from the collector substation to the individual turbines. The main collection line will follow the access road, with each turbine connected to the main line via an underground connection. The main collection line will consist of both underground and overhead lines. Underground lines will be installed from WTG-10 to just east of the WTG-2 and 3 spur road. From there, the collection line will be installed overhead on poles running adjacent to the access road, along its east side. Where the access road intersects the PSNH transmission line corridor the collection line will be installed underground to the collector substation. The electrical collection system is shown on the civil design drawings, which are provided in Appendix 7A of this Application.

Permanent Meteorological Tower

A permanent meteorological tower will be installed on the ridgeline between WTG#3 and WTG#4 to obtain wind data at the Project site for wind turbine performance management. This tower will be approximately 100 meters (328 feet) in height and will replace the existing temporary meteorological tower on the site.

H.2. Identification of the applicant's preferred location and any other options for the site of each major part of the proposed facility

Eolian Renewable Energy (Project co-sponsor) has extensive experience in the identification and evaluation of potential wind energy sites in New England. Since the founding of the company in 2009, Eolian has evaluated over 90 prospective terrestrial wind power sites throughout New Hampshire, Maine, Vermont, and Massachusetts and has developed a unique multi-criteria evaluation model for final assessment of site suitability. The model criteria exceed industry standards in all cases and require a unique combination of interrelated geographical, infrastructural and environmental characteristics. The identification of the Antrim Wind Energy site was the result of a southwestern regional prospective site analysis nested within Eolian's statewide model for wind energy suitability in New Hampshire. In applying this methodology the main site selection criteria include an adequate wind resource (based on meso wind models), environmental appropriateness, grid-interconnection, proximity to transportation routes, and distance from residences. Prior to settling on the Antrim site for the Project, alternative nearby sites in both Stoddard and Marlow were considered as well. Ultimately, Marlow was determined to be less desirable and potentially unsuitable due to a lack of nearby transmission resources as well as the presence of extensive wetland resources. The Stoddard location was determined to be less favorable due to siting complications arising from substantial amounts of land being under conservation easements and increased difficulty with potential access to the area from existing roadways. The Antrim site, after extensive review, was determined to be the preferred location and a suitable site for the Project.

The siting criteria discussed above that led to the initial selection of the Antrim Project site over other alternatives, as well as further diligence efforts that confirmed early assumptions, are discussed more fully below.

Competitive Wind Resources

As a renewable source, the energy potential of the wind is unevenly distributed across the landscape. For areas such as interior New England there is a very strong correlation between elevation and the strength of the wind resource, with higher elevations experiencing markedly stronger winds when compared to lowland locations. But the adequacy of the wind resource is not simply a function of wind speeds; it is also dependent on wind speed stability and consistency, wind direction and directional variability (as well as the orientation of the relevant landform to the prevailing wind direction(s)), seasonal and daily fluctuations, wind shear, and turbulence. Many areas that appear to be adequate in terms of wind speed are ultimately not viable due to the other qualities of the overall wind resource.

The process of determining whether a prospective site has an adequate wind resource is long and requires the installation of meteorological monitoring equipment for a period of at least two years. AWE has been monitoring on-site winds with a 60 meter meteorological tower since 2009. The Project has also evaluated the wind resource with remote sensing technology. Through sophisticated analyses of the on-site wind data and scaling for long-term accuracy, the Project's meteorological consultants have confirmed that the site does have an adequate wind resource (IEC Class IIa). In addition to sufficient wind speeds, the other characteristics of the wind resource are well suited to the generation of wind energy.

Environmental appropriateness

A wind energy project should be sited to minimize the incremental impacts to sensitive environmental resources. The location of a wind project should be consistent with existing land uses and should not compromise sensitive conservation lands or unique wildlife habitats. A well-sited project should carefully consider the potential for effects on local and regional wildlife and vegetation as well as the potential for impact to surrounding scenic and recreational resources.

The proposed Antrim Wind Energy Project site is suitable from an environmental perspective. During its preliminary investigation, AWE confirmed that there are no conservation restrictions on the site that would limit the development of the Project. In addition, desktop GIS review of known environmental factors did not reveal the presence of any known critical habitats or endangered species. This has also been confirmed by field reconnaissance conducted at the Project site. Wetland impacts are almost entirely avoided: there will be only 0.192 acres of wetlands impacted as a result of the Project. In addition, the elevation of the site, between 1042 and 1904 feet above mean sea level, eliminates the potential for impacts to sensitive high elevation alpine habitats. See Sections H.3. H.4, and I.5 for a more detailed explanation of the various studies that have been conducted to demonstrate the environmental appropriateness of the site.

Compatibility with existing land uses

Wind projects should be sited in a way that is as compatible with existing land uses as possible. Land in the Project area has long been used as woodlots and open space, which is compatible with wind farm development. Much of the northern slope of Tuttle Hill has been heavily logged in the past decade; as recently as last year logging operations (unrelated to the Project) have impacted hundreds of acres of the site. Once the Project is complete, landowners who have leased lands to the Project will continue to be free to manage the bulk of their properties much as they do today. It is also noteworthy that there is substantial public support for the Project among Antrim residents, as evidenced by third party public opinion polls and recent town votes concerning wind energy development in Antrim. AWE believes that such support indicates a general local agreement that the Project is compatible with existing land uses.

Grid-interconnection

Wind energy projects need to be sited in reasonable proximity to existing electrical infrastructure. In addition, the existing infrastructure needs to be technically capable of receiving the new generation. The Antrim site offers both attributes. It is proximate to existing transmission infrastructure and will not require the development of any new transmission lines. Based on analysis by AWE's transmission consultant, the existing infrastructure has the capacity to accommodate the Project's output.

Accessibility

Wind energy projects need to be located within close proximity to existing transportation infrastructure and in the best cases are located near transportation routes. The Antrim site is located adjacent to State Route 9, which is a major thoroughfare. Proximity to such a roadway facilitates the transport and delivery of construction equipment and turbine components without requiring extensive upgrades of existing roadways.

Adequate setbacks from residences and recreational resources

Wind turbine generators should be sited to avoid potential public health and safety risks that may arise if turbines are located too close to residences, public buildings, or public recreational areas. The closest non-participating residence to a turbine in the Project is 2,800 feet and there are no public recreational facilities such as parks or playgrounds within 3,000 feet of the Project. These distances are more than adequate to protect public health and safety in these areas.

Distance from roads

Wind turbines should be sited so as to maintain a reasonable distance from nearby roadways. The Project is sited with more than sufficient safety setbacks from nearby public roads and rights of way. The nearest public road to any turbine location is State Route 9 to the north, which is located more than 3,000 feet north of the northernmost turbine. The two private roads to the northwest are slightly closer than Route 9 but are still located more than 2,800 feet from the nearest turbine.

Compatibility with local, regional and state long-range planning goals

The siting of wind energy facilities should be compatible with previously defined planning goals at a variety of scales. Criteria for determining compatibility should focus on energy and land use priorities within both state and local frameworks.

The Antrim Master Plan, updated as recently as 2010, speaks extensively and supportively of the need for renewable energy development. The Master Plan contains a 15-page section addressing climate change, energy efficiency and renewable energy and calls for the Planning Board and planning department to encourage renewable energy uses (see Appendix 15). The Project clearly meets these objectives. In addition, the Project will support many of the Southwest Regional Planning Commission's stated goals. The Commission identifies "current lack of local, renewable energy alternatives" to conventional energy sources a substantial risk to future growth in the region (see Appendix 16). Finally, New Hampshire state planning and zoning laws require that planning regulations and zoning ordinances encourage the installation and use of renewable forms of energy such as wind projects (see RSA 672:1, III-a and RSA 674:17. I.(j). The Project also contains a substantial land conservation package as an integral component of the Project, preserving 685 acres in total, and this project component is compatible with other aspects of the Antrim Master Plan that state the importance of the preservation of open space.

Availability of privately owned lands

The development of wind energy projects typically requires the use of privately owned lands and that landowners take an active interest in the development of their property for renewable energy purposes. AWE has a leasehold interest in approximately 1,850 acres of land on seven parcels from five individual landowners. These leases, which have been recorded at the Hillsborough County Registry of Deeds, have an initial term of 25 years, with an option to extend the leases for an additional 25 years.

Cultural resources

Wind energy projects should be sited so as to avoid negative impacts to historic resources to the greatest extent possible. All Project components are sited in such a way that does not cause any adverse direct effects on Precontact or historical archaeological or architectural resources.

H.2.a. Alternatives analysis

In addition to the above-mentioned factors that influenced the initial selection and confirmation of the Antrim Project site, AWE also considered several different site-specific design configurations in the course of developing the Project. These alternatives took into consideration the impacts of each design that might result from the construction of roadways to access ridgelines, installation of foundations, and erection of turbines and other site infrastructure on wetlands, tree clearing, wildlife, aesthetics and overall project efficiency for construction purposes. The specific methods and measures discussed below were used to minimize impacts to the greatest possible.

On-site alternatives considered

On-site alternatives included a number of different potential turbine layouts, road configurations, electrical collector system designs, wind turbine types, and various locations for the O&M building, switchyard, and permanent meteorological tower location.

Alternative 1 – Larger project size

One alternative that was considered was a larger project, with an expanded layout capable of accommodating 11 turbines. Specifically, this alternative was based on a layout similar to the final ten turbine array but with the addition of another turbine to the south, on the mid-slope flank of Willard Mountain. This alternative was evaluated in terms of wind resource suitability, engineering constraints, and anticipated impacts. This alternative was ultimately eliminated in favor of a more compact project footprint while maintaining a greater distance to the Willard Pond wildlife sanctuary.

Alternative 2 – Different access routes

The Project also considered several different alternatives to the final design of the access road and crane path. The most significantly different route that was considered had the access road originating further to the west, along Route 9 at its junction with the private

Russell Road. Under this scenario, the ridgeline access route continued to the south to gain elevation but with an overall alignment generally to the west of the final design. This alternative was ruled out due to legal issues around property ownership and unclear chain of title on one of the proposed parcels.

AWE also considered the possibility of developing project access from the south. This would have involved the use and improvement of local Town roads. It would have required the transport of heavy machinery closer to residential areas and Town recreational resources such as Gregg Lake. Based on these additional impacts, AWE eliminated the southern access alternative from further consideration.

AWE also considered a variety of access variations that were substantially similar to the final design. All of the potential alternative access alignments were ruled out in the favor of the final design, which offers the shortest acceptable route that minimizes impacts to wetlands resources as well as project costs.

<u>Alternative 3 – Different turbine models</u>

A number of wind turbine models were evaluated for efficiency, reliability, cost, transport specifications, construction requirements, spacing constraints, and overall site suitability within the site's various constraints. The consideration of alternate turbine models encompassed a range of manufacturers, rated capacities, tower heights, and rotor diameters. The Project evaluated turbine models manufactured by General Electric, Vestas, Acciona, Nordex, REpower, Alstom, Gamesa, and Siemens. AWE's reasons for evaluating the Acciona AW-116 are discussed in Section C.6.

<u>Alternative 4 – Alternative plant layouts</u>

Antrim Wind Energy has considered several alternatives to the final configuration of the plant facilities. As discussed above, several different road access options were considered. In addition to those, the Project evaluated almost ten different turbine layouts, three different layouts for the locations of the electrical substation and maintenance building, and two different locations for the erection of the permanent meteorological tower. Of the three alternate locations considered for the siting of the substation and O&M building, the final locations were selected in the interest of minimizing wetland impacts and maximizing construction efficiency. Finally, of the two different alternatives for the location of the permanent meteorological tower, the final location was selected because it minimizes interruption of the wind resource upwind of the turbine locations and because it retains the best setback distances from neighboring property lines. AWE also considered the utilization of overhead collector system lines on the ridgeline, since the site is of a low enough elevation that major icing concerns are not expected to be a problem. Ultimately, however, underground roadside collector system lines were chosen in order to minimize visual impacts as well as to reduce the potential risk to avian and bats species that use the area.

H.3. A description in detail of the impact of each major part of the proposed facility on the environment for each site proposed

Antrim Wind Energy, LLC has sited and designed the proposed Project, as a whole, to avoid and minimize environmental impacts to the greatest extent feasible. AWE has addressed construction and operation impacts by various means.

Numerous environmental studies have been conducted to identify important natural resources, such as wetlands, vernal pools, rare plants and significant natural communities. Numerous wildlife studies have been conducted to identify potential impacts to specific wildlife populations. Studies on noise, aesthetic and historic resource impacts have been performed. Air and water quality impacts have also been assessed. The results of these studies have been applied during the design phase to avoid and minimize impacts wherever possible. Some of these studies will help to guide operations to assure impact minimization over the life of the Project. Each of these studies and assessments, as well as discussion regarding impacts and avoidance, minimization and/or mitigation measures, are described in detail in Section I of this Application.

In terms of the area that will be directly impacted by the Project, AWE has designed the Facility to avoid and minimize direct impacts to the greatest extent possible. Access has been designed to minimize environmental impacts to important resources: an example of this is routing the access road to avoid wetlands or vernal pools. Similarly turbine sites will require clearing and have been located to avoid direct wetland and vernal pool impact to the extent practical. Further information and specific details relevant to access impacts on natural resources are contained in the Joint USACE/NHDES Standard Dredge and Fill Permit Application and Alteration of Terrain Permit Application, as referenced in Section D.3 of this Application and provided in Appendix 2.

H.4. A description in detail of the applicant's proposals for studying and solving environmental problems;

As noted in Section H.3, AWE has engaged in extensive studies to assess potential environmental impacts that may occur as a result of the proposed Project. Studies were performed relevant to the following:

- natural communities and rare plants;
- historical and archaeological values;
- wetlands and vernal pools;
- breeding birds;
- nocturnal avian migration;
- diurnal raptor migration;
- bat populations and use;
- bald eagle nesting;

- aesthetics;
- noise;
- shadow flicker; and
- stormwater.

The results of these studies have been applied during the design phase to avoid and minimize impacts wherever possible. Each of these studies and assessments, including discussion regarding potential impacts and avoidance/mitigation strategies, are described in Section I of this Application.

In addition to the avoidance and minimization strategies employed and/or proposed to address potential environmental concerns created by the proposed facility, the Project will also result in environmental benefits in the form of conservation and displacement of energy from non-renewable sources.

AWE has successfully negotiated several local land conservation agreements that will protect approximately 685 acres of land within and adjacent to the proposed Project. This initiative will conserve valuable undeveloped lands in perpetuity.

Finally, it is important to consider that the proposed Project will displace the need for power generation from other sources, thus reducing the net environmental impact of energy production as a whole. A full report on avoided emissions is provided in Appendix 10A, and summarized in Section I.3, below. Other energy sources, such as fossil fuels, hydropower and nuclear power, are known to create significant environmental problems. The Project will help alleviate some of these problems by producing power that:

- Does not produce pollutants or greenhouse gases;
- Does not produce waste that requires disposal;
- Reduces reliance on non-renewable sources such as fossil fuels; and
- Eliminates the need for transporting fuels to the generation site, thereby further reducing fossil fuel consumption and pollutant production.

H.5. A description in detail of the applicant's financial, technical and managerial capability to construct and operate the proposed facility

Antrim Wind Energy, LLC, through its member-owners, has a demonstrated track record of success in the electric power industry with over 60 years of combined energy asset development and management experience including the development, permitting, financing, construction and operation of thousands of megawatts of electric generation capacity in the United States, including New England.

AWE Ownership Structure

Antrim Wind Energy, LLC ("AWE") is a Delaware limited liability company formed to develop, build, own and operate the Antrim Wind Project. AWE has two members - Eolian Antrim, LLC, and Westerly Antrim, LLC – which in turn are owned respectively by Eolian Renewable Energy, LLC ("Eolian") and Westerly Wind, LLC ("Westerly"). Eolian and Westerly are the Project's "sponsors," i.e. the entities ultimately responsible for the development, financing, construction and operation of the Project.

Eolian, a Delaware limited liability company headquartered in Portsmouth, New Hampshire, was formed in 2009 to manage the development, construction, and operation of utility scale wind energy facilities in New England. Eolian is the original developer of the Project. Its four principals, along with consultants and contractors engaged by Eolian, are actively developing four projects in Maine, New Hampshire, and Vermont, with a total aggregate capacity of 152 megawatts (MW). Eolian's approach is to develop appropriately sized projects in the best locations, balancing the need for preservation and the need for clean energy development. The founder and CEO of Eolian, Jack Kenworthy, previously founded Cape Systems, Ltd., a leader in renewable energy project development in the Bahamas. Eolian's co-founder and Vice President of Development, John Soininen is trained as a civil engineer and real estate developer with over 15 years of management experience in complex high value real estate development projects totaling over $100 million.

In January 2011, Eolian and Westerly entered into a Joint Development Agreement, and Eolian Antrim LLC and Westerly Antrim LLC entered into a corresponding Limited Liability Company Agreement to advance the Antrim Wind Project through development, financing, construction and operation. Westerly Wind, LLC is a Delaware limited liability company based in Braintree, Massachusetts. It was formed in 2009 to provide development capital, management expertise and commercial assistance to independent wind power developers. Westerly is a portfolio company of US Renewables Group ("USRG"), which is an energy investment firm founded in 2003. USRG focuses exclusively on investing in renewable power, biofuels and clean technology infrastructure and has invested approximately $750 million of capital in clean energy companies and projects. The Westerly team currently consists of 4 members who work in the area of renewable energy development.

The Westerly management team has considerable experience in the energy sector, and has been directly involved in the development, financing, construction and operation of over 4,000 MW of independent power assets, including over 700 MW of wind power projects, representing over $3 billion of aggregate project financings. Westerly's management team members' have previously worked for American National Power, Inc., Catamount Energy Corporation, Duke Energy Corporation, US Renewables Group and John Hancock Financial Services. A founder and the CEO of Westerly, Joseph Cofelice, was previously the CEO of American National Power and the President of Catamount Energy. During Mr. Cofelice's tenure as President of Catamount, that company successfully developed and financed approximately 585 MW of wind power generation assets utilizing industry standard tax equity and lending structures totaling approximately $1 billion of aggregate project financings.

<u>Applicant's Financial Capability</u>

AWE's financing plan for the Antrim Project reflects customary practices found not only within the wind industry, but throughout the broader independent power generation sector. The wind industry benefits from well-established financing structures for both construction and term financing. These structures have been developed and enhanced over the last ten years by industry participants.

The Applicant expects to employ a "project finance" approach to sourcing capital for the construction and operating phases of the Project. While the specific structure utilized will depend on the availability and type of tax incentives applicable to the wind industry at the time of construction, the Applicant plans to utilize industry standard non-recourse project finance, which will include monetization of the tax attributes generated by the Project. By definition, non-recourse project finance is the long-term financing of infrastructure and other highly capital intensive projects where the capital provider's interest is secured by the future cash flows of the project rather than the balance sheet of the project sponsors. This form of financing is "non-recourse," in that the capital provider only has claim to the assets and cash flow of the project, rather than the assets or credit of the project sponsors. Non-recourse project financing of independent power projects has been a common practice in the United States independent power sector since the early 1980's.

The all-in cost of constructing the Project is estimated to be $55-65 million. AWE expects to obtain the capital to construct the Project through a combination of construction loans, and sponsor or third party provided equity. Construction funding will be replaced or "taken out" by permanent project capital upon the Project meeting certain conditions precedent including, but not limited to, commercial operation. The permanent project capital will include sponsor or third party provided equity and capital provided by an institutional tax equity investor. AWE expects to enter into construction and permanent funding agreements simultaneously; therefore the Applicant will have both committed construction and operating capital in place before construction of the Project commences.

A liquid and robust capital market exists for well-conceived, construction-ready wind projects. Potential providers of construction and long-term project financing include: large independent power producers and energy companies (strategic capital), infrastructure investment funds, tax equity investors, and project lenders. There are currently at least twelve active tax equity investors and at least 22 active lenders providing capital to the wind energy sector. The Project's ability to raise capital from these capital providers will depend on many factors, including: 1) completion of all necessary development tasks, including environmental studies; 2) receipt of a non-appealable Site Evaluation Committee certificate; 3) execution of a financeable power purchase or financial hedge agreement for the offtake of power ("Off-Take

Agreement"); 4) execution of other key commercial agreements including a financeable turbine supply agreement, a balance of plant construction contract, and an operating and maintenance agreement; and 5) completion of all necessary interconnection studies and the finalization of transmission/interconnection cost estimates. Drawing on the sponsors' management experience and expertise, AWE possesses the capabilities needed to complete development and to negotiate all agreements necessary to obtain permanent financing of the Project.

AWE expects to make progress advancing key project commercial agreements and that such progress will accelerate upon receipt of a certificate from the SEC. While execution of all the key commercial agreements will be necessary to effect a project financing, the most critical component of the financing package will be securing an Off-Take Agreement. Upon the receipt of an SEC certificate, AWE believes the probability of arranging a financeable Off-Take Agreement will be materially higher due to: 1) a lower risk profile; 2) the receipt of all material permits for construction and operation; 3) the Project's very competitive wind resource; and 4) an anticipated reasonable cost of interconnection relative to similar wind projects in New England. With the receipt of both the SEC certification and the execution of an Off-Take Agreement, AWE believes the Project will proceed rapidly to a construction financing and actual construction.

Applicant's Technical and Managerial Capability

AWE will be responsible for the general management of the Project, including the execution and administration of the commercial agreements that will assure that the windfarm is constructed and operated in conformance with accepted industry practices and a Certificate of Site and Facility. In addition to the above-described qualifications of Eolian's management team, members of Westerly's management team have served in various senior level positions at companies that managed independent power projects and owned wind farms. Westerly's CEO, Joe Cofelice served as President of Catamount Energy Corporation and President and CEO of American National Power, while Westerly's Vice President, Sean McCabe, served as a senior project developer at Duke Energy and Catamount Energy.

As previously discussed, AWE expects to award a BOP contract to a third party construction contractor experienced in wind farm construction. AWE's current operating plan is to contract with the turbine manufacturer during the warranty period (typically 2-5 years in duration) for operation and maintenance ("O&M") services. This is a common contractual arrangement in the early years of a wind project that ensures the wind farm is operated and maintained in a manner consistent with provisions of the equipment warranty. After the warranty period, AWE will either extend the term of the O&M agreement with the turbine supplier or contract with another third party O&M service provider to operate the Project, a common industry approach to wind farm operations in the U.S. wind industry. However, the post-warranty period operating plan may change depending on the O&M capabilities of a potential long-term equity provider.

The terms of the O&M agreement will reflect standard industry practices to ensure that the facility is operated safely, in a manner consistent with the terms of the interconnection and Off-Take Agreements, and that turbines are maintained in accordance with the manufacturer's specifications. The O&M agreement will address the provider's expected service level standards and performance guarantees. It is anticipated that the scope of the service provider's responsibilities will include:

1. <u>Scheduled and Unscheduled Maintenance:</u>

The O&M provider will perform scheduled turbine maintenance in accordance with the manufacturer's suggested service intervals (every 6 months in the case of the Acciona AW116), as well as any necessary unscheduled maintenance. The scope of these responsibilities will include the procurement of all required materials, equipment, labor, supplies, consumables, supervision and record-keeping.

2. <u>Operations and Safety:</u>

The O&M provider will monitor the performance of the facility on a 24/7 basis, initiate any required curtailments and resets during off-hours, ensure the facility complies with all grid requirements for safety and reliability, and maintain a spare parts inventory to perform required services in a prompt manner.

3. <u>Management Reporting:</u>

The O&M provider will compile operating data and management reports, and conduct regular meetings with AWE and third party capital providers.

AWE will maintain overall management responsibility for the Project and provide on-site management to ensure compliance with all regulatory and legal requirements, including on-going compliance with the SEC Certificate, the Town of Antrim Agreement, as well as requirements under Federal Energy Regulatory Commission ("FERC"), North American Electric Reliability Council ("NERC") and ISO-New England regulations. In addition, AWE site personnel will supervise the O&M provider, and represent AWE in all matters related to site administration and balance of plant matters not covered by the third party O&M agreement. On-site management responsibilities will also include: 1) managing day-to-day relationships with the Town of Antrim and the State of New Hampshire; 2) ensuring that the turbine supplier and third party O&M provider are properly complying with the terms of the turbine supply and O&M agreements; 3) arranging for and overseeing other site contractors, such as road and substation maintenance personnel; 4) assuring environmental compliance such as under the Avian and Bat Protection Plan; 5) managing landowner relations; and 6) coordinating any other site visitors.

In terms of site staffing levels, AWE expects having not less than five (5) on-site personnel including an AWE site manager, an AWE site administrator and at least three (3) full-time O&M technicians, based on actual O&M proposals that AWE has received from turbine manufacturers.

H.6. A statement of assets and liabilities of the applicant; and

See Section H.5. A redacted statement of the Applicant's assets and liabilities is provided in Appendix 1 of this Application. An unredacted statement is filed separately with a Motion for Protective Order and Confidential Treatment.

H.7. Documentation that written notification of the proposed Project, including appropriate copies of the application, has been given to the governing body of each community in which the facility is proposed to be located.

The Town of Antrim Board of Selectmen will be provided with a copy of this application at the time it is filed with the Site Evaluation Committee. The Applicant will file a copy of the return receipt or other documentation of receipt by the Town with the SEC and has reserved Appendix 8 for this purpose.

I. POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS AND MITIGATION PLANS

I.1. Aesthetics

AWE enlisted Saratoga Associates to perform a Visual Impact Analysis (VIA) for the Project. A copy of the completed VIA can be found at Appendix 9A.

The study area for the VIA extends to a five mile radius from each turbine and is characterized by mountains, hills, and valleys, with elevations varying from approximately 443 feet to 2,468 feet above sea level. The area is heavily forested, with patches of agricultural land. Residences are widely scattered, though there are more thickly settled and developed areas, most notably the village center of Antrim itself. Water features are numerous but comprise a relatively small portion of the study area. Notable water bodies within the study area include Gregg Lake and Willard Pond.

Viewshed maps were created to determine from which locations the Project might be visible. First a map was created without taking vegetation into account. This revealed where intervening topography by itself would limit views of the turbines. A second map was then prepared which included the possible screening effects of vegetation. Based on this analysis, taking topography and vegetation into account, it was determined that potential screening will restrict views of the Project from 94.7% of the study area. The areas most directly affected by views of the Project will be where there is a significant amount of cleared or open land (including water bodies) within close proximity to the Project. This will occur at locations such as Gregg Lake, Willard Pond, and Bald Mountain.

Based on the information contained in the maps, specific locations were chosen for further evaluation to determine the potential visual impact to each one. It is accepted visual impact analysis to select locations which are generally considered by society (through regulatory designation or policy) to have cultural and/or aesthetic importance. These include:

- Recreation areas including playgrounds, athletic fields, fishing access, campgrounds, and other recreational facilities/attractions;
- Significant publicly accessible areas devoted to the conservation or the preservation of natural environmental features (e.g., reforestation areas/forest preserves, wildlife management areas, open space preserves);
- A bicycling, hiking, ski touring, or snowmobiling trail designated by a governmental agency;
- A property on the National or State Register of Historic Places;
- Architectural structures and sites of traditional importance as designated by a governmental agency;
- Parkways, highways, or scenic overlooks and vistas designated by a governmental agency;

- Important architectural elements and structures representing community style and neighborhood character;
- An interstate highway or other high volume (relative to local conditions) road of regional importance; and
- A residential area greater than 50 contiguous acres and with a density of more than one dwelling unit per acre.

The above visually sensitive resources were identified though a review of published maps and other paper documents, online research, and a windshield survey of publicly accessible locations. The visual impact of the Project on these areas was then evaluated by taking into consideration each location's specific setting, who would likely be affected, the distance between the location and the Project, and the duration of the view.

Settings within the Project area include the community center of Antrim, forest areas, water bodies, and agricultural land. Each setting can be affected differently. Views from a community center such as the village of Antrim are generally short distance views focused along streets, and are more likely to be framed or filtered through foreground vegetation and buildings. Forest landscapes, which dominate the region, are even more likely to have filtered views of the Project due to the presence of dense vegetation. While views during leaf-off season are likely to be more prominent, they are still filtered and are generally limited to occasional distant views along roadways and overlook vistas. Water views, particularly from lakes and ponds, are generally long-distance and open, but can also be filtered or framed depending on one's location on the water body. The same is true of views from open agricultural land; however, while views of these areas generally have some cultural and aesthetic importance, views from these areas are not generally considered to hold such importance since they are not typically accessed by the public.

Distance affects the apparent size and degree of contrast between an object and its surroundings. The VIA used distance zones established by the U.S. Forest Service in its evaluation of the Project's visual impact. Foreground views are views that are up to a half mile away. At this distance visual impacts are at their highest, since viewers will notice a high level of detail and contrast with the surrounding landscape. The VIA demonstrates that there will be no foreground views of the Project. Middleground views are from between one half mile and three miles; at this distance visual detail is reduced but distinct patterns may still be evident. From this distance the contrast of color and texture are identified more in terms of the regional context than by the immediate surroundings. Background views are from between three and five miles away, and at this distance landscape elements lose detail and become less distinct. Views from this distance typically have the least impact on the viewer.

Viewers engaged in different activities are likely to perceive their surroundings differently, even if they are in the same landscape setting. Some viewer groups will be more sensitive to visual change than others. Local residents, local workers, through travelers, and tourists will all perceive the Project differently. Local residents, who know the landscape well and are most likely to have frequent and/or prolonged views of the Project, are likely to be the most sensitive to changes in particular views that are important to them. However, this sensitivity may diminish over time due to repeated exposure. Local workers who work inside are least likely to be affected, while those working outside will most often be focused on their work while giving only occasional consideration to the surrounding landscape. Through travelers are generally focused on the road in front of them; their views will be intermittent. These viewers will generally not have a high degree of sensitivity to the visual change that the Project might bring. Visual quality is often most important to tourists and other recreational users of an area, since they are typically in the area to enjoy the scenery. Often, however, these viewers are focused on their particular activity, such as boating or hiking, and may not be affected by views of the Project. In addition some may find a wind farm to be visually unique or aesthetically pleasing. In fact, other viewers may be attracted to the sight of a wind farm since it represents a renewable and locally-produced energy source.

The duration of a view is also important to an evaluation of the impact of a change in landscape on the viewer. Stationary views, which are generally experienced from residential neighborhoods and recreational areas, offer the greatest opportunity to view the Project. Moving views, by contrast, offer less time for viewers to be affected by the Project, particularly since these views are typically available to motorists who are focused on driving. A summary of the visibility of the Project from inventoried resources, which takes into account the factors described above, can be found in Table 2 of the VIA (Appendix 9A).

To further assess the visual impact of the Project on specific locations, the Project reached out to local community organizations (including the Select Board, Planning Board and Historical Society) who suggested sites which they felt were of particular significance. Photographs and photosimulations showing before-and-after depictions of the Project were then prepared considering these locations. These photographs and photosimulations can be found in the VIA at Appendix 9A.

Taking all these considerations into account, the VIA concludes that the proposed Project will be visible from several identified public resources and is likely to have an effect on the visual/aesthetic character of some mid-ground views within the study area. By their very nature, modern wind energy projects are large and highly visible facilities. The need to position these tall moving structures in highly visible locations cannot be readily avoided. The siting of wind turbines along a mountain ridgeline provides increased opportunity for potentially discordant views both near and far. The level of impact will be dependent on the viewer's sensitivity to visual change among other influencing factors discussed in this analysis. Views of the Project may at first appear in contrast with the unaltered landscape, but over time will become an integral part of it.

While the use of mitigation techniques may help to minimize adverse visual impact, the construction of the Project will be an undeniable visual presence on the landscape.

However, unlike development projects such as housing complexes and commercial centers, the proposed wind energy facility can and will be decommissioned and removed at the end of its useful working life. Upon decommissioning, all of the towers will be removed and the Project area restored to as near its present condition as possible, thus restoring the landscape to its original condition. Thus, the visual impacts of the Project will not exist in perpetuity.

Other Project Components

Night Lighting

Existing residences, commercial buildings, communications towers, streetlights, and headlights from cars are typical sources of light pollution in the study area. While red flashing aviation obstruction lights may be visible in the study area, the additional concentration of six lit turbines will be evident from throughout the area. Although aviation obstruction lighting is generally directed upward, the relatively low intensity does not result in perceptible atmospheric illumination (sky glow).

Access Road

The access road will be characteristic of local roads visible throughout the area. The access road is a relatively minor component of the overall Project and it is anticipated that it will not be highly visible, or seen as being out of place, by local residents or passers-by.

Meteorological Tower

A permanent 100-meter self-supporting grey lattice tower will be constructed in order to continuously collect wind data (e.g. wind speed). The tower will be similar in appearance to cellular towers that are scattered throughout the region. This tower will be similar in height to the turbines' nacelles and may be visible from locations that have visibility of the Project. This slender tower will appear inferior in comparison to the proposed turbines.

O & M Building and Electrical Substation

The O & M building and substation will be located adjacent to the existing PSNH 115kV transmission line, which will be utilized for the Project. Its placement is in keeping with its surroundings and will not appear out of context. Visibility of the O&M building and substation will be limited from many views given that they are located in a wooded area and are both more than 500 feet south of Route 9. Travelers along NH State Route 9 may catch a glimpse of these facilities up the proposed access road, however, visibility of these structures will be fleeting as site lines will be limited.

Electrical Collector System

Electricity from each turbine will be routed to the proposed substation via a newly constructed electrical collector system. The majority of these power lines will be buried beneath the road, however there is a section that will be attached to aboveground poles located adjacent to the access road. It is anticipated that approximately 32 utility poles (up to 35 feet in height) will be erected between the permanent meteorological tower and the new substation. These poles will be wooden and substantially similar in nature to others seen within the study area and across the state. However the collector system poles are generally smaller and are expected to be less obvious then those currently seen within the existing PSNH transmission corridor. If the poles are visible, it is anticipated that they will not be highly noticeable or be out of context with the Project.

Construction-Related Impacts

Construction of the Project will require the use of large mobile cranes and other large construction vehicles. Turbine components will be delivered in sections via large trucks and stored at a designated laydown area until used. The construction period for each turbine is expected to be quite short. As such, construction related visual impacts will be brief and are not expected to result in adverse prolonged visual impact to area residents or visitors.

I.2. Historic sites

The Project will not adversely impact any known archaeological sites. AWE contracted a Phase I review for both pre-contact period and historic period archaeological resources. A Phase IA study was conducted by archaeologists after consultation with New Hampshire Division of Historical Resources ("NHDHR") and the U.S. Army Corps of Engineers ("USACE") (in May and July of 2011). The Phase IA study revealed no documented evidence of archaeological sites within the Project area or any environmental or cultural variables, which would suggest the presence of archaeological sites within a 10 km radius of the Project area.

During November 23-26, 2011, a Phase IB archaeological walkover survey of the Project Area of Potential Effect ("APE") was performed. While some stone walls in the lower elevations on the northern side of Tuttle Hill were identified, no historic features (e.g. cellar holes) were identified in the Project APE. It was determined that no subsurface testing was needed and no additional archaeological evaluation was recommended. As a result, the Project is not predicted to have an adverse impact on historic or pre-contact archaeological sites. The Phase I survey report (which combines the Phase IA and IB surveys) was filed with the NHDHR on December 7, 2011. A copy of the Phase I survey report can be found in Appendix 9B of this Application. Based on the information provided in the Phase I survey report, NHDHR has concluded that there are no known properties of archaeological significance within the area of the Project's potential impact and no further identification or evaluative studies are recommended. A copy of this NHDHR determination can be found at Appendix 9C.

While the Project will not physically alter any existing historic buildings or structures, it could affect them through visual impacts. In order to evaluate the potential impacts of the Project on known historic resources, A.D. Marble & Company completed a file search at the NHDHR to gather information on established contexts, previously surveyed properties, and properties within the Project area that have been listed in or determined eligible for listing in the National Register of Historic Places (National Register). Additional research was conducted at the New Hampshire State Library, the New Hampshire Historical Society, Dartmouth College, Plymouth State College, and the James A. Tuttle Library in Antrim. A member of the Antrim Historical Society and members of other area historical societies were also contacted.

Based on the work conducted to date, the Project is unlikely to have any unreasonable adverse effect on any known historic resources. In fact, the Project area form identified only one property within the three-mile radius that was previously listed in the National Register (the Flint Estate Historic District, NHDHR No. ANT0001) and one property that was previously determined eligible for listing in the National Register (Antrim Congressional Church in Antrim Center, NHDHR No. ANT0005). As the Flint Estate Historic District was listed in the National Register for its architectural significance and not as a rural estate, it does not have the potential to be affected by changes in setting that the new Project may introduce; therefore, it is unnecessary to further assess the potential effects of the Project on this resource. A preliminary perspective of the historic architectural survey suggests that a number of National Register-eligible properties may be located in the Project's APE (defined by the three-mile viewshed). Thus, the nature and extent of potential visual impacts of the proposed Project on historic buildings, structures and/or districts is still under review. The review of any potential visual impacts will continue by the USACE, in consultation with the NHDHR. It is important to note that no buildings or structures will be acquired or physically altered or removed by the Project; thus, impacts, if any, would be limited to those resulting from the visibility of the Project from the historic property of a setting that might contribute to the significance of such historic properties. A copy of the NHDHR Area Form can be found at Appendix 9D.

I.3. Air quality

Once constructed, the Antrim Wind Energy Project will produce no air emissions, therefore it will not have an adverse impact on local air quality. Moreover, as a source of clean, renewable energy, the Project will reduce reliance on fossil fuel generation plants, which do produce pollutants that adversely impact air quality.

AWE commissioned a study to evaluate air pollutants that will be avoided or displaced as a result of operation of the proposed Project. This study applies the Time Matched Marginal ("TMM") emissions model, developed by Resource Systems Group ("RSG"), Inc. This methodology is based on generally accepted principles and procedures for estimating emissions reductions from wind and other renewable electric power generation on the electric grid. The report concludes that the operation of the Project will result in significant avoided air emissions. Table 1.3 shows these total expected avoided annual emissions. The full report on avoided air emissions is provided in Appendix 10A of this Application.

Table 1.3: Total Expected Avoided Annual Air Emissions

Total Expected Avoided Annual Emissions								
Source	MWH	Tons					
		NOx Nitrogen Oxides	SO_2 Sulfur dioxide	CO_2 Carbon dioxide	**PM** Particulate matter	N_20 Nitrous Oxide	CH_4 Methane
Gas	81,103	8	8	36,532	28	0.1	0.7
Oil	10,428	9	33	10,188	3	0.2	0.9
Coal	11,063	8	45	12,636	4	0.2	0.2
Annual	*102,725*	*26*	*87*	*59,753*	*35*	*0.5*	*1.9*

As can be seen in the table, the Project may be expected to displace emissions of over 59,000 tons of carbon dioxide, and an additional 150 tons of sulfur dioxide, nitrogen oxides, particulate matter and other toxins on average each year. There are specific environmental benefits to these reductions in emissions. For example, a reduction in Nitrogen oxide (NOx) emissions can contribute to reducing the occurrence of high ozone days in New England and eastern Canada. Reductions in Sulfur dioxide (SO_2) emissions can reduce the impact of acid precipitation on regional forests and lakes. The expected reduction in Carbon dioxide (CO_2) emissions represents a significant reduction in the production of greenhouse gases.

Collectively, these expected reductions in the production of toxic air emissions support the concept that the proposed Project will provide net benefit (or a positive net impact) in terms of air quality. Not only will the Project supply needed electric power while producing no air pollutants of its own, it will effectively reduce the production of toxic air pollutants from other sources of electric power. In addition the Project is also expected to save approximately 17,500,000 gallons of fresh water each year due to the displacement of fossil fuel energy sources that use water for cooling or creating steam to power turbines.

I.4. Water quality

The Project is not anticipated to have an unreasonable adverse impact on water quality. There will be no water withdrawal or discharge associated with this Project. Potential impacts to water quality include erosion and sedimentation during the construction portion of the Project, blasting, and changes in stormwater runoff once the Project is complete. The Project is designed to meet the standards set forth in the following applications, which are appended to this application as noted: Joint USACE/NHDES Standard Dredge and Fill Permit Application (Appendix 2A), NHDES Alteration of Terrain Application (Appendix 2B), and NHDES Section 401 Water Quality Certification Request (Appendix 2C).

The Project site straddles four watersheds: North Branch River; an unnamed stream which continues to its confluence with North Branch River at Steels Pond, and then on to Franklin Pierce Lake; Gregg Lake; and Willard Pond. In addition, several wetlands, vernal pools, and intermittent streams were identified on site during a natural resources survey performed by TRC in 2011.

Erosion and Sedimentation Control (ESC)

Various best management practices ("BMPs"), including NHDES's BMPs for blasting will be employed prior to and during construction to limit the mobilization of total suspended solids from disturbed surfaces. BMPs will include both temporary and permanent measures such as: mulch berms, silt fence, straw bale barriers, stone check dams, slope drains, rock stabilization of channels, seeding and mulching, erosion control matting, and temporary sediment traps. All have proven efficacy in similar projects characterized by steeper terrain, shallow depth to groundwater and short growing seasons. ESC devices will be monitored frequently to ensure that they are working properly; this will occur least once a week or after rain events delivering more than one half inch of rain. Corrective measures will be taken as soon as possible if any ESC devices are shown to be performing inadequately. The BMPs and ESC devices that will be employed during Project construction and operation are illustrated on the civil design drawings provided in Appendix 7A of this Application.

Blasting Best Management Practices

NH DES has developed a set of BMPs entitled "Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts," which state that "[a]ll activities related to blasting shall follow Best Management Practices (BMPs) to prevent contamination of groundwater including preparing, reviewing and following an approved blasting plan; proper drilling, explosive handing and loading procedures; observing the entire blasting procedures; evaluating blasting performance; and handling and storage of blasted rock." These BMPs will be incorporated into the Blasting Plan developed by the blasting contractor.

Stormwater Management

Given that the Project will result in a relatively small amount of new impervious area distributed between four expansive, largely undeveloped watersheds, it is unlikely that the development will result in a significant increase in runoff compared to the pre-development condition. According to a stormwater runoff analysis (see Alteration of Terrain Application at Appendix 2B) performed by TRC civil engineers, it is reasonable to conclude that the construction of the Project will not result in an increase in peak rates of runoff from the site.

The stormwater management system has been designed to minimize impacts to the existing natural drainage ways. Because much of the access road will be constructed on the crest of the ridge, overall drainage patterns and directions of flow will remain generally the same. A permeable road base (rock sandwich) will be provided at appropriate locations to maintain sheet flow conditions and provide hydraulic connectivity between wetlands. Where steep roadway/ditch slopes will impede the effectiveness of a permeable road base, culverts have been spaced every 100 feet in order to minimize channelization of runoff. In addition, oversized culverts will be installed in locations where animals are likely to need to cross under the roadway.

The roadway will cross two identified streams. At one stream crossing, the road is in approximately 10 feet of cut. This is necessary in order to meet the maximum slope requirement of 12% for construction and delivery vehicles. As such, impacts to the stream cannot be avoided. At the second stream crossing a 3-sided concrete box culvert has been designed to comply with NHDES stream crossing guidelines.

The Project has been laid out to minimize wetland impacts to the greatest extent practicable. Construction will result in only 0.188 acres (approximately) of unavoidable wetland impacts.

The Project will comply with design requirements for runoff quality control included in Chapters 2 and 4 of the New Hampshire Stormwater Manual ("SWM"). To address the applicable water quality treatment standards for this Project, the stormwater management system incorporates a combination of roadway buffers, ditch turnout buffers, treatment swales, and bioretention basins. A copy of the complete Stormwater Management Plan can be found in the Alteration of Terrain Application at Appendix 2B.

I.5. Natural environment

For the purpose of this discussion, information pertinent to natural environment shall be described in the following categories: plants and trees; wetlands and vernal pools; and wildlife. Each of these categories, including potential impacts and mitigative measures, is discussed in the following subsections.

I.5.a. Plants and Trees

(a) __Natural Communities__

In June 2011, a Natural Community survey was performed for the Antrim Wind Energy Project. This effort included a desktop review of existing data for the Project area, consultation with the New Hampshire Natural Heritage Bureau ("NHNHB"), and assessment of aerial photography and field surveys. The classification of the site's natural communities was done in accordance with the "Natural Communities of New Hampshire, Second Edition" (Sperduto & Nichols, 2011). The study area for the natural community assessment was the same as that which was assessed for wetlands, rare plants and other natural resources; this area is depicted on the Natural Community Map depicted in Figure I.5.a. The full natural community assessment report is provided in Appendix 11A of this Application.

In general, the Project site is undeveloped and forested. The area has been subject to industrial timber harvesting in the past several decades. For this reason, the area includes patches of successional forest in various stages of regeneration. For the purpose of classifying community types, early successional forest areas were classified as the community type into which they will develop. The area also includes some acreage that has been recently clear cut; these areas were classified as such.

No significant natural communities were identified as a result of this survey.

Table I.5.a summarizes the natural communities that have been identified within the natural resource study area. These natural communities are illustrated on Figure I.5.a, Natural Community Map. Each of these community types is described in detail in the full study report provided in Appendix 11A.

Figure I.5.a: Natural Community Map

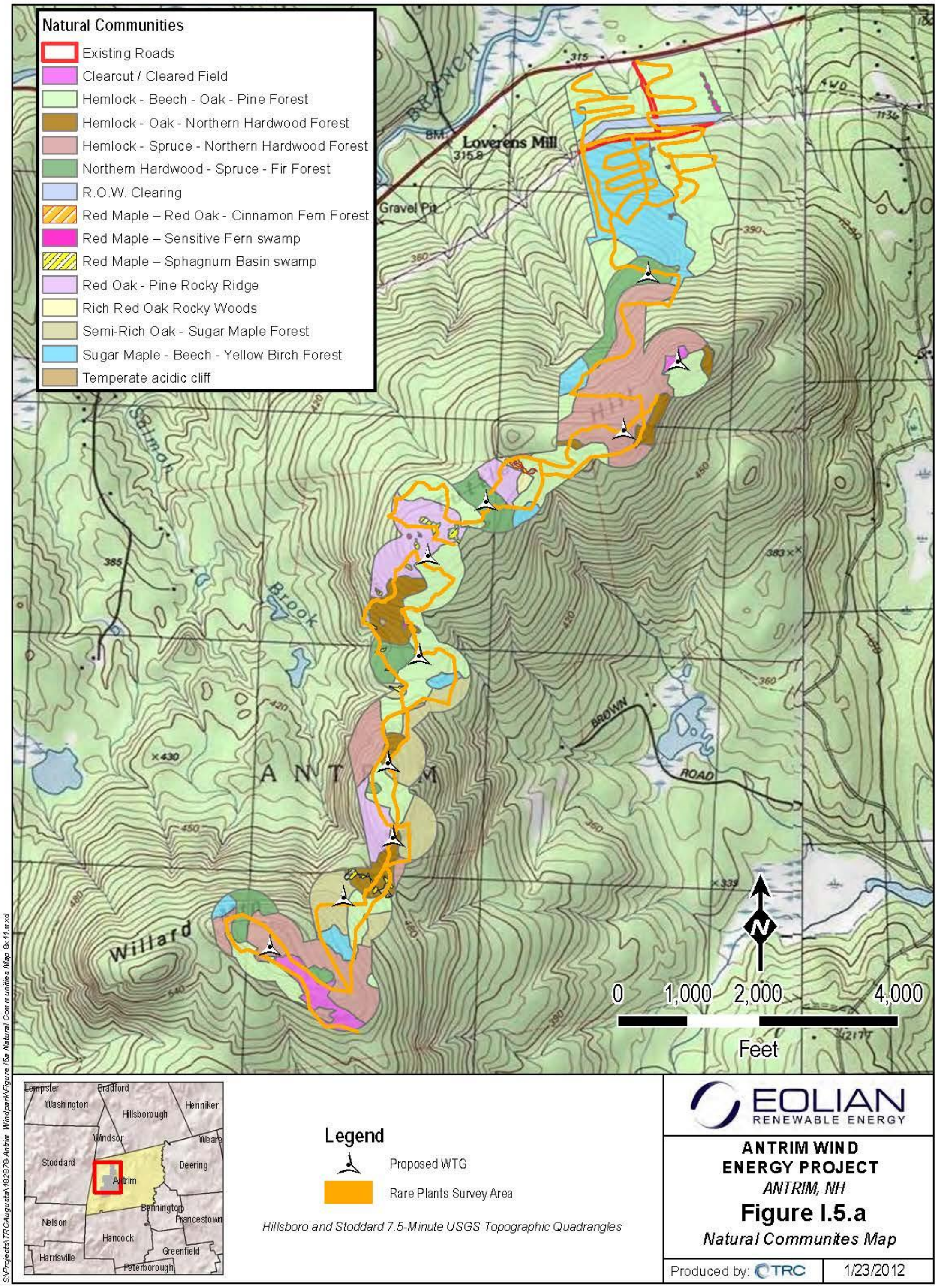


Table I.5.a.: Natural Communities Identified in the Natural Resource Study Area

Natural Communities	Approximate Acres	Approximate % cover of assessment area
Hemlock - Beech - Oak - Pine Forest	155.3	33.61%
Hemlock - Oak - Northern Hardwood Forest	24.9	5.39%
Hemlock - Spruce - Northern Hardwood Forest	93.7	20.28%
Northern Hardwood - Spruce - Fir Forest	34.54	7.48%
Red Oak - Pine Rocky Ridge	33.7	7.29%
Red Maple – Cinnamon Fern Swamp	0.6	0.13%
Red Maple – Sensitive Fern Swamp	1	0.22%
Red Maple – Sphagnum Basin Swamp	3.2	0.69%
Rich Red Oak Rocky Woods	1	0.22%
Semi-Rich Oak - Sugar Maple Forest	35.8	7.75%
Sugar Maple - Beech - Yellow Birch Forest	57.1	12.36%
Temperate Acidic Cliff	0.9	0.19%
Existing Roads	4.6	1.00%
Clearcut / Cleared Field	9.3	2.01%
R.O.W. Clearing	6.4	1.39%

(b) Rare Plants

Prior to field investigations for rare plants, the New Hampshire Natural Heritage Bureau ("NHNHB") was consulted in order to identify any known or potential rare plant and/or natural community occurrences for the proposed Project site. No historic records were found as a result of this consultation. As described above, a Natural Community survey was performed in 2011. No significant natural communities were identified as a result of this survey.

Field surveys for rare plants were performed in August 2011. The study area for the rare plant survey was the same as that being assessed for natural communities. This area is depicted on the Natural Community Map provided in Figure I.5.a, above. The investigation covered all identified natural communities, as well as intervening habitats such as power line corridors, roadsides, clearings and cut-over areas. Special emphasis was placed on species reported from identified natural communities by the NHNHB and New Hampshire species protected under the federal Endangered Species Act.

Some natural communities that have the potential to support rare or uncommon species were observed at the Antrim Wind study area; however, the species observed during rare plant surveys were generally common. No rare plants or species of concern were found. The complete Rare Plant Survey Report is provided in Appendix 11B of this Application.

(c) Impacts and mitigation for natural communities and rare plants

The proposed Project will not result in any impacts to significant natural communities, rare plants or communities which are likely to support rare plants. For this reason, there are no avoidance or mitigation plans specific to these resources.

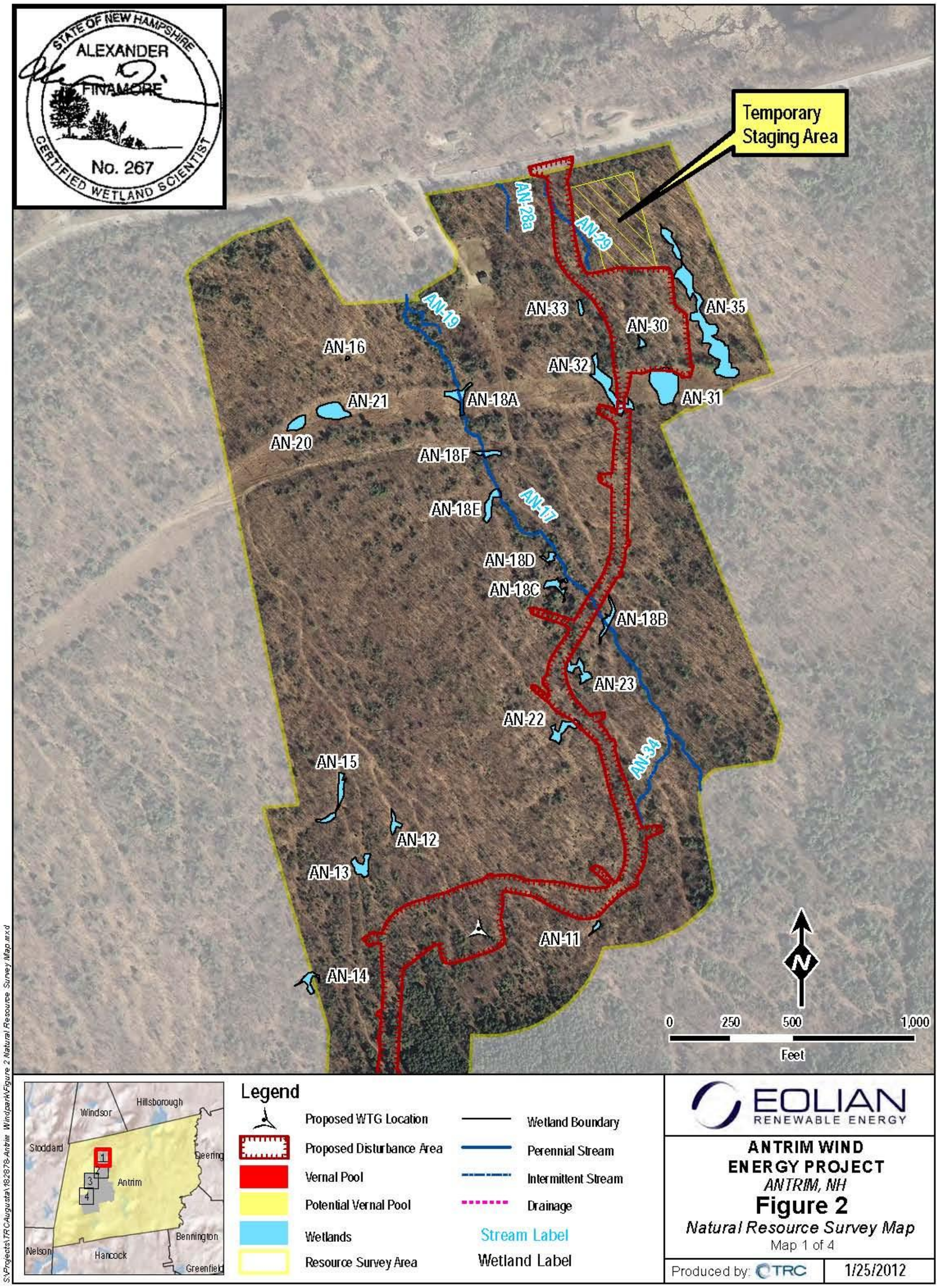
Again, it should be noted that AWE successfully negotiated several local land conservation agreement which will protect approximately 685 acres of land adjacent to the proposed Project. This initiative, while not necessary for mitigation of any potential impacts to natural communities or rare plants (for the reasons noted above), will nonetheless conserve valuable undeveloped lands in perpetuity. These lands are similar in character and natural communities to those that will be developed by the proposed Project.

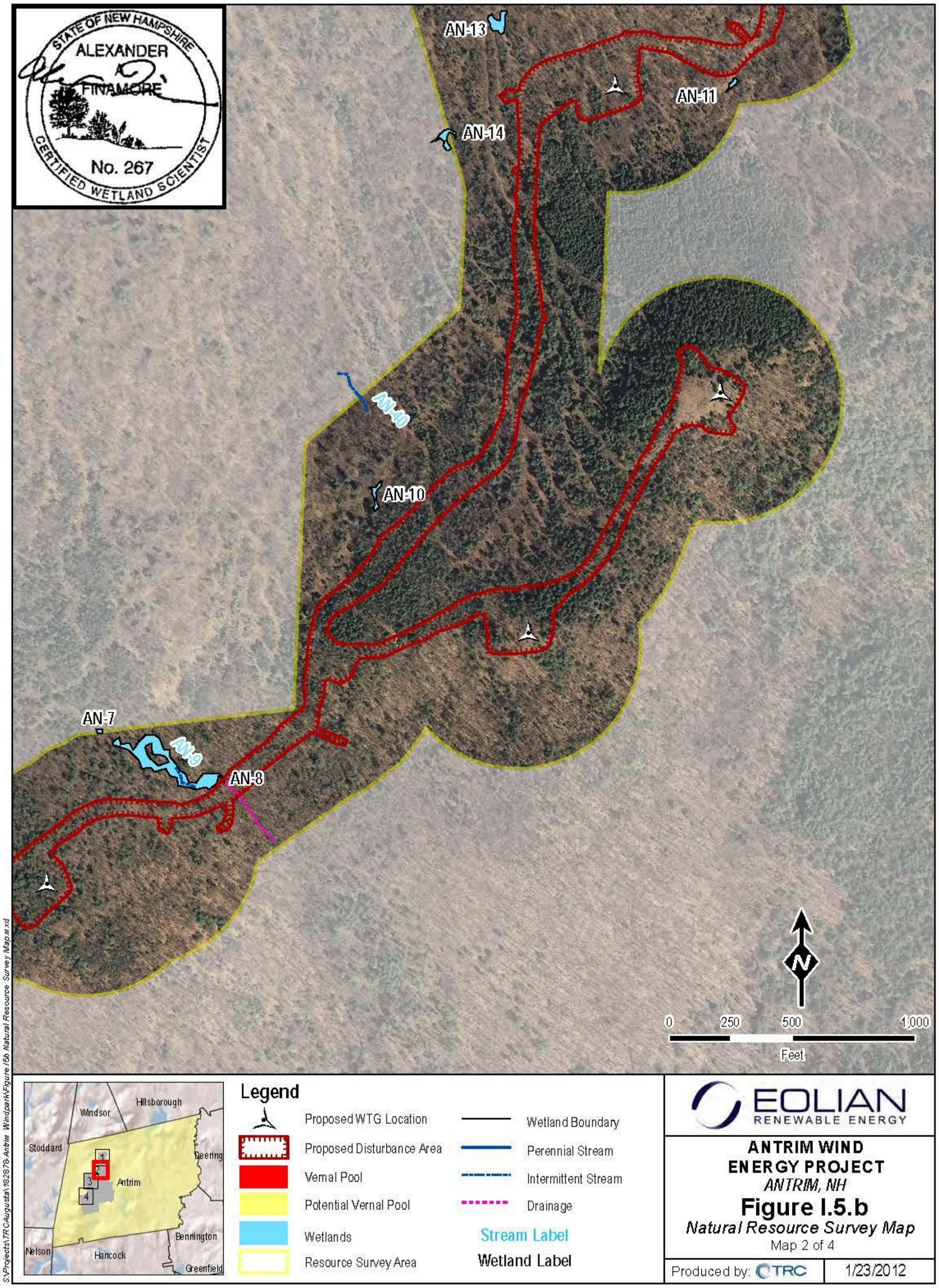
Again, it should also be noted that the proposed Project is a clean and renewable energy facility that will displace need for energy from other sources which produce adverse air emissions (see Section I.3). This elimination of tons of adverse air emissions from our atmosphere as a result of Project operation provides a net environmental benefit to natural communities.

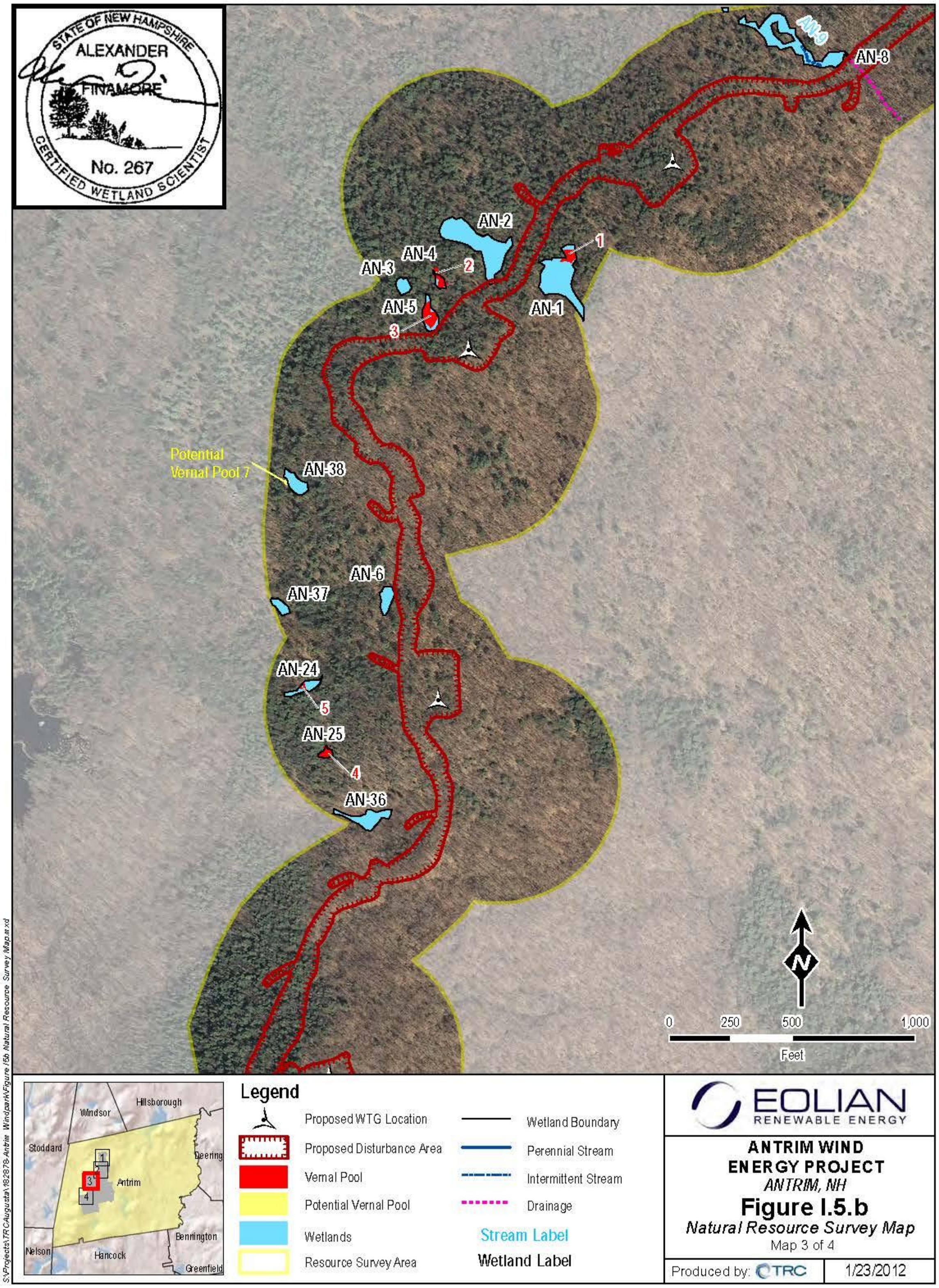
I.5.b. Wetlands and Vernal Pools

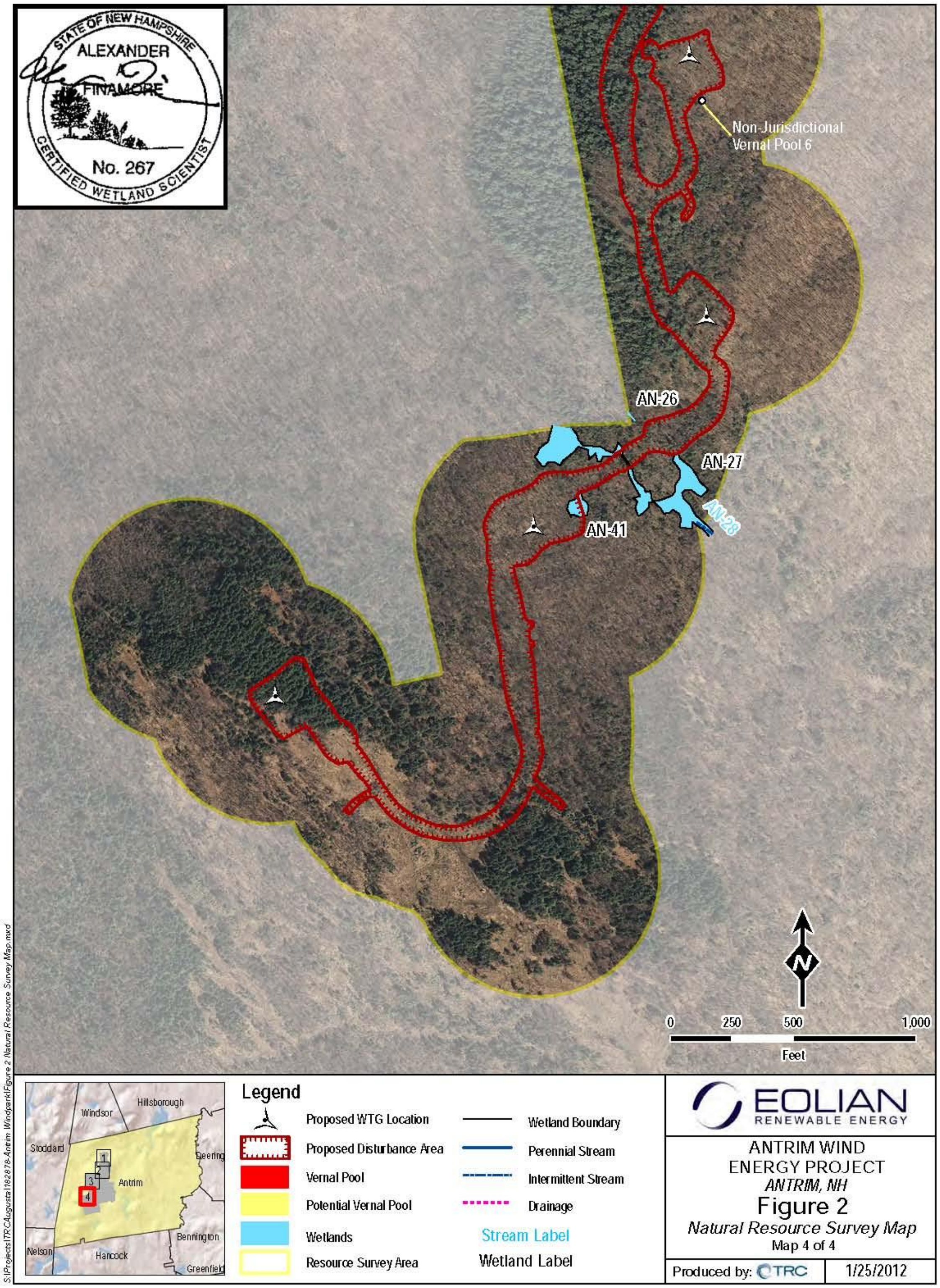
Wetland and vernal pool surveys were completed within the natural resource survey area during spring, summer and fall of 2011. The survey area as well as all wetland and vernal pool features identified are depicted in Figure 1.5.b. Discussions regarding identified wetland and vernal pool features follow, respectively.

Figure 1.5.b: Natural Resource Survey Area




STATE OF NEW HAMPSHIRE
ALEXANDER
FINAMORE
No. 267
CERTIFIED WETLAND SCIENTIST
AN-13
AN-11
AN-14
AN-40
AN-10
AN-7
AN-9
AN-8
0 250 500 1,000
Feet
Hillsborough
Windsor
Stoddard
Deering
Antrim
Bennington
Nelson
Hancock
Greenfield
Legend
Proposed WTG Location
Proposed Disturbance Area
Vernal Pool
Potential Vernal Pool
Wetlands
Resource Survey Area
Wetland Boundary
Perennial Stream
Intermittent Stream
Drainage
Stream Label
Wetland Label
EOLIAN
RENEWABLE ENERGY
ANTRIM WIND
ENERGY PROJECT
ANTRIM, NH
Figure I.5.b
Natural Resource Survey Map
Map 2 of 4
Produced by: TRC
1/23/2012


STATE OF NEW HAMPSHIRE
ALEXANDER
FINAMORE
No. 267
CERTIFIED WETLAND SCIENTIST
AN-9
AN-8
AN-2
1
AN-4
2
AN-3
AN-5
AN-1
3
Potential Vernal Pool 7
AN-38
AN-6
AN-37
AN-24
5
AN-25
4
AN-36
N
0
250
500
1,000
Feet
Windsor
Hillsborough
Stoddard
Deering
Antrim
Bennington
Nelson
Hancock
Greenfield
Legend
Proposed WTG Location
Proposed Disturbance Area
Vernal Pool
Potential Vernal Pool
Wetlands
Resource Survey Area
Wetland Boundary
Perennial Stream
Intermittent Stream
Drainage
Stream Label
Wetland Label
EOLIAN RENEWABLE ENERGY
ANTRIM WIND ENERGY PROJECT
ANTRIM, NH
Figure I.5.b
Natural Resource Survey Map
Map 3 of 4
Produced by: TRC
1/23/2012


STATE OF NEW HAMPSHIRE
ALEXANDER
FINAMORE
CERTIFIED WETLAND SCIENTIST
No. 267
Non-Jurisdictional Vernal Pool 6
AN-26
AN-27
AN-28
AN-41
N
0
250
500
1,000
Feet
Hillsborough
Windsor
Stoddard
Deering
Antrim
Bennington
Nelson
Hancock
Greenfield
Legend
Proposed WTG Location
Proposed Disturbance Area
Vernal Pool
Potential Vernal Pool
Wetlands
Resource Survey Area
Wetland Boundary
Perennial Stream
Intermittent Stream
Drainage
Stream Label
Wetland Label
EOLIAN RENEWABLE ENERGY
ANTRIM WIND ENERGY PROJECT
ANTRIM, NH
Figure 2
Natural Resource Survey Map
Map 4 of 4
Produced by: TRC
1/25/2012

(a) Wetlands

Wetland surveys were conducted for the proposed Antrim Wind Energy Project in late summer and fall of 2011. This effort identified wetlands within the natural resources study area as depicted on the Natural Resource Survey Map, illustrated on Figure 1.5.b, above.

A total of 33 wetlands and 8 streams were identified as a result of this effort. These features are listed in Table I.5.b(a). Detailed narrative descriptions of each feature listed are provided in the full wetland report, which is provided in Appendix 11C of this Application. Each feature listed is illustrated on Figure 1.5.b, above.

In general, wetlands within the surveyed area consist primarily of small forested wetlands that occur along skidder trails, in confined pockets in the regional bedrock, in saddle areas along the ridgeline, and in areas with poorly drained soils that support wetland vegetation. Streams within the Project area include unnamed perennial and intermittent streams which drain either to the north toward Route 9, or to the southeast into Gregg Lake. Because the proposed Project area is along a ridgeline and is moderately well drained, very few perennial streams occur. Observations in the field generally suggest that rainfall and snow-melt quickly run off the ridge to lower elevations, without collecting volumes that fill natural depressions or create natural ponds.

Table I.5.b(a): Wetlands and Streams Within the Natural Resource Survey Area

Summary of Wetlands and Watercouses within the Natural resource Survey Area			
Wetland / *Stream* ID	**Cowardin Classification**	**General Description**	**Associated Features**
AN1	PFO1	Isolated forested wetland. Contains VP1.	Vernal Pool VP1
AN2	PFO4	Isolated forested wetland.	
AN3	PFO1	Isolated forested wetland.	
AN4	PFO1	Isolated forested wetland. Contains VP2.	Vernal Pool VP2
AN5	PFO1	Isolated forested wetland. Contains VP3.	Vernal Pool VP3
AN6	PFO1	Isolated forested wetland.	
AN7	PFO1	Isolated forested wetland.	
AN8	PFO4	Forested wetland draining southeast, associated with intermittent stream AN9.	Stream AN9
AN9	*(intermittant stream)*	Intermittant stream associated with wetland AN8.	Wetland AN8
AN10	PFO1	Isolated forested wetland within skidder trail.	
AN11	PFO1	Isolated forested wetland with ephemeral inlet and outlet.	
AN12	PFO1	Isolated forested wetland within skidder trail.	
AN13	PFO1	Isolated forested wetland along ATV trail.	
AN14	PFO1	Isolated forested wetland within skidder trail.	
AN15	PFO1	Isolated forested wetland within skidder trail.	
AN16	PFO1	Very small isolated wetland along old skidder trail.	
AN17	*(perennial stream)*	Perennial stream associated with wetlands AN18a, b, c, d, e & f.	Wetland AN18
AN18	PFO1/4 & PSS1	6 forested wetland areas (AN18 a, b, c, d, e & f) draining north, associated with perennial stream AN17.	Stream AN17
AN19	*(intermittant stream)*	Intermittant stream which flows into perennial stream AN17	Stream AN17
AN20	PSS1	Isolated scrub-shrub wetland within transmission ROW.	
AN21	PSS1	Isolated scrub-shrub wetland within transmission ROW.	
AN22	PFO1	Isolated forested wetland within skidder trail.	
AN23	PFO1	Isolated forested wetland within skidder trail.	
AN24	PFO1	Isolated forested wetland. Associated with VP5. ATV trail within wetland.	Vernal Pool VP5
AN25	PFO4	Isolated forested wetland. Associated with VP4.	Vernal Pool VP4
AN26	PFO1	Forested wetland draining to the northwest.	
AN27	PFO1	Forested wetland draining to the southeast. Associated with intermittent stream AN28.	Stream AN28
AN28	*(intermittant stream)*	Intermittant stream associated with wetland AN27.	Wetland AN27
AN28a	*(intermittant stream)*	Intermittant stream associated with wetland AN27.	Wetland AN27
AN29	*(intermittant stream)*	Intermittant stream.	
AN30	PFO1	Isolated forested wetland with ephemeral inlet and outlet.	
AN31	PSS1	Isolated scrub-shrub wetland within transmission ROW.	
AN32	PSS1	Isolated scrub-shrub wetland within transmission ROW.	
AN33	PFO1	Isolated forested wetland within skidder trail.	
AN34	*(intermittant stream)*	Intermittant stream which flows into perennial stream AN17.	Stream AN17
AN35	PFO1/PSS1	Isolated forested an scrub-shrub wetland located in transmission ROW and to the north of the transmission ROW.	
AN36	PFO1	Isolated forested wetland with peat soils.	
AN37	PFO1	Isolated forested wetland adjacent to ATV trail.	
AN38	PFO1	Isolated forested wetland with potential vernal pool.	
AN40	*(intermittant stream)*	Intermittant stream.	
AN41	PFO1	Isolated forested wetland.	

(b) Vernal Pools

Vernal pool surveys were conducted for the proposed Antrim Wind Energy Project in May of 2011. This was a field effort which consisted of visual meander surveys throughout the entire natural resources study area as depicted on the Natural Resource Survey Map, illustrated on Figure 1.5.b, above. Additional surveys for vernal pools, as described below, were completed in September 2011. Verification of a potential vernal pool that was identified in September 2011 will occur in the spring of 2012. (Note: this feature is not within the area of proposed development).

All features identified were classified into three categories, as described below.

(1) Natural vernal pools: natural vernal pools are those which meet the criteria provided in state rules.

(2) Potential vernal pools: potential pools are those that were identified outside of the indicator species breeding season. These pools have the physical characteristics as described in the state and federal definitions, but will require a visit in breeding season to confirm the presence of indicator species use.

(3) Non-jurisdictional features: these features include all other areas where amphibian breeding was documented but did not meet the state and federal definition of a vernal pool.

A total of 7 features were identified within the natural resource study area during the vernal pool survey. Of these, 5 were identified as natural vernal pools, 1 was identified as a potential vernal pool, and 1 feature was designated as a non-jurisdictional amphibian breeding area. Although intensively sought, no fairly shrimp were found or documented within any of the identified features. Furthermore, no rare or state-listed threatened or endangered species known to use vernal pools for at least one critical life stage were documented in any of the identified features.

A summary of each feature identified is provided in Table I.5.b(b), below. Descriptions of these features follow. The features listed in the table below are illustrated on the Natural Resource Survey Maps provided in Figure 1.5.b, above. A full Vernal Pool Survey Report, including field data forms and site photographs is provided in Appendix 11D of this Application.

Table I.5.b(b): Vernal Pools Identified in the Natural Resource Survey Area

Pool ID	Category	Natural Setting (y/n)	Indicator Species Observed	Holds Water for 2+ Months (y/n)	Associated Wetland
VP1	Natural	Y	Spotted Salamander – 8 egg masses Wood Frog – 5 egg masses Green Frog - Vocalization	Y	AN1
VP2	Natural	Y	Spotted Salamander – 16 egg masses Wood Frog – 1 egg mass	Y	AN4
VP3	Natural	Y	Spotted Salamander – 9 egg masses Wood Frog – 5 egg masses	Y	AN5
VP4	Natural	Y	Spotted Salamander – 55 egg masses Wood Frog – 4 egg masses	Y	AN25
VP5	Natural	Y	Spotted Salamander – 10 egg masses	Y	AN24
VP6	Non-Jurisdictional	N	Spotted Salamander – 9 egg masses	N	Upland
VP7	Potential	Y	None Observed	Y	AN38

Natural Vernal Pools: the Features identified as VP1 through VP5 have been classified as natural vernal pools in accordance with criteria listed in state rules. These five pools are within isolated palustrine forested wetlands along the Tuttle Hill ridgeline and are located in depressions within the regional bedrock. Each of these pools occurs in natural isolated basins with no inlets or outlets. None of these pools support populations of predatory fish.

Potential Vernal Pools: Due to changes in Project scope that evolved during the siting phase of the Project, additional surveys for vernal pools were completed in September of 2011. One additional feature (VP7) was identified as a result of these additional surveys. VP7 is located within an isolated forested wetland (Wetland AN38), roughly midway between the previously identified features VP3 and VP5.

At the time of survey (September 27, 2011), wetland AN38 was observed to have an area of standing water approximately 1 foot deep which contained an abundance of shrubby vegetation. The area appeared to be conducive to supporting egg attachment sites for pool breeding amphibians. An ephemeral outlet drains the wetland to the northwest through a gap in the regional bedrock. This outlet does not meet the criteria for a stream or wetland, and does not have the necessary characteristics to support predatory fish populations. Since the pool was observed on September 27th, which is outside of the indicator species' peak breeding season, a second visit in the spring will be necessary to determine the presence of vernal pool species.

Non-Jurisdictional Features: The feature identified as VP6 has been classified as a non-jurisdictional pool. This feature is man-made; it is located within a depression in an old woods road. While the pool was wetted during initial surveys in May, it was observed to be completely dry on June 6, 2011. No hydrophytic vegetation was observed in the vicinity of the pool depression. Based on these parameters, the feature identified as VP6 is considered a non-jurisdictional feature.

(c) Impacts and Mitigation for Wetlands and Vernal Pools

No jurisdictional vernal pools, or areas currently described as potential vernal pools will be impacted as a result of Project construction or operation. Eight identified wetlands will be impacted either temporarily or permanently; the acreage of impacts for each of these wetlands is listed below.

Table I.5.b(c): Wetland Impacts

WETLAND IMPACTS			
Wetland ID	Type	Acres	Square feet
AN-2	PFO	0.007	316
AN-8	PFO	0.001	34
AN-22	PSS	0.009	379
AN-23	PFO	0.0004	16
AN-27	PFO	0.019	815
AN-30	PFO	0.020	869
AN-31	PSS	0.019	848
AN-32	PSS	0.033	1,449
AN-41	PFO	0.083	3,621
TOTAL		***0.192***	***8,349***

In total, 0.192 acres (8,349 square feet) of permanent wetland impact are expected to be incurred as a result of construction and operation of the proposed Project. This small amount of impact is the result of careful Project planning and design, which aimed to avoid and minimize impacts to these important resources. The direct wetland impacts are those which were deemed unavoidable during the Project planning process. The specific details of each of the above listed areas of impact are described in the NHDES Site Specific Alteration of Terrain permit application, which is provided in Appendix 2B of this Application.

NHDES rules state that compensatory mitigation is required for minor impact projects with permanent jurisdictional impacts of 10,000 square feet or greater (Env-Wt 303.03). Because the proposed Project will result in less than 10,000 square feet of permanent wetland impacts, no compensatory mitigation is required.

During construction, Best Management Practices for working in and near wetlands will be applied. During construction and operation, appropriate stormwater runoff and erosion control measures will also be applied. Best Management Practices, stormwater runoff prevention and erosion control practices to be employed are described in detail in the

NHDES Site Specific Alteration of Terrain permit application (see Appendix 2B), and the joint USACE/NHDES Standard Dredge and Fill permit application (see Appendix 2A).

I.5.c. Wildlife

In the spring of 2011, AWE consulted with state and federal agencies to identify the scope of wildlife studies to be performed relevant to the proposed Project. Consulting agencies included United States Fish and Wildlife Service ("USFWS"), New Hampshire Fish and Game Department ("NHFGD"), New Hampshire Natural Heritage Bureau ("NHNHB"), New Hampshire Department of Environmental Services ("NHDES"), the United States Army Corps of Engineers ("USACE"), and the United States Environmental Protection Agency ("USEPA").

As a result of consultation with the aforementioned agencies, the following pre-construction studies were identified as necessary to assess the potential impacts of the proposed Project on wildlife:

- Breeding bird surveys;
- Diurnal raptor migration surveys;
- Radar surveys for nocturnal avian migration;
- Rare raptor nesting surveys;
- Acoustic bat monitoring; and
- Bat mist nesting surveys

All pre-construction study protocols were designed to be consistent with those typically recommended by state and federal regulatory agencies for proposed wind power projects; they were also designed to be consistent with surveys conducted in the past at other similar projects in New England and New Hampshire. Draft protocols for breeding bird surveys, diurnal raptor migration surveys, nocturnal radar surveys, rare raptor nest surveys, and acoustic bat surveys were provided to each of the consulting agencies in March, 2011. AWE met with consulting agencies on April 6, 2011 to discuss these draft study protocols. Protocols were revised, as appropriate, based on consultation, and were provided to the consulting agencies on May, 23 2011. The USFWS was the only party that responded to this submittal, by letter, on October 13, 2011. See Appendix 12A. The April 6 meeting also precipitated a request to perform bat mist netting surveys, a protocol for which was subsequently developed and executed in consultation with NHFGD.

It should be noted that, during consultation, a desktop GIS review of known environmental factors was performed. No known critical habitats or endangered species occurrences were identified as a result of this effort. Furthermore, in their October 13, 2011 letter, the USFWS again confirmed that:

> *"Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available."*

The findings of each of the pre-construction wildlife studies performed relevant to the proposed Antrim Wind Energy Project are summarized, below. A discussion on potential Project impacts to birds and bats, as well avoidance and mitigation strategies relevant to these impacts, follows. Full survey reports for each of the wildlife studies are provided in Appendix 12 of this application.

(a) Breeding Bird Surveys

A breeding bird survey for the Antrim Wind Energy Project was performed in June and July of 2011. The goal of this survey was to document the pre-construction presence, diversity and relative abundance of breeding bird species in the proposed area of development. Breeding bird surveys used point count methods based on those used for the Vermont Institute of Natural Science's Mountain Birdwatch program (VINS 2005) and Bird Studies Canada's High Elevation Landbird Program (HELP) (Whittam & Ball 2002, and 2003).

Point counts were conducted at 12 locations along the ridge of Tuttle Hill and Willard Mountain. Point count locations were representative of habitat types within and adjacent to the area proposed for Project development. Six of the points were located in close proximity to areas that will be disturbed by the proposed Project development; the other six were located outside of the area that will be directly disturbed. Each point count location was visited twice during the study period, which occurred between June 1 and July 15, 2011. All surveys were conducted at dawn (between 4:30 AM and 8:30 AM).

In addition to formal bird surveys, habitat parameters associated with point count locations were also quantified. This was done using methods that were developed specifically for making habitat measurements associated with estimating bird populations (James and Shugart 1970); these methods are still used by the national Breeding Bird Survey (USGS 2009), as well as other current studies. The results of this effort are detailed in the full study report, which is provided in Appendix 12A of this Application.

A total of 131 individual birds, representing 25 different species, were documented during the formal breeding bird surveys. An additional 14 species were observed incidentally during other field work which occurred during the summer breeding season. These observations constitute a total of 39 bird species recorded in the Project vicinity during the breeding season of 2011. A list of breeding bird species identified formally during breeding bird surveys, and informally as incidental observations, is provided in Table I.5.c(a), below.

The most frequently observed bird species, in terms of relative abundance, were ovenbird and blackburnian warbler; 17 individuals of each species were observed, constituting a 12.98% relative abundance for each. The next most abundant species were red-eyed vireo (n=14) and myrtle warbler (n=12), at 10.69% and 9.16% relative abundance, respectively. The relative abundance of each species documented is presented in Table I.5.c(a), below.

The assemblage and relative abundance of birds observed is typical of the region, and of the habitats found within the study area. No rare birds or birds of conservation concern were observed during formal breeding bird surveys. Incidental observations of the common nighthawk, a state listed endangered species, were made in the vicinity of Willard Mountain and Tuttle Hill in June of 2011. One of these observations was auditory and consisted of aerial vocalizations in the area of Willard Mountain. The other observation was visual, and consisted of several nighthawks foraging over the valley to the north of Tuttle Hill; these birds were outside of the area proposed for Project development. These observations were discussed during consultation with USFWS, NHNHB, NHDES, and NHFGD on June 21; no concerns with regard to these observations were expressed.

Table I.5.c(a): Breeding Bird Species Identified Within the Antrim Wind Energy Project Vicinity

Breeding Bird Species Observed within the Antrim Wind Energy Project Vicinity					
Common Name	Latin Name	Residence*	Number Observed	Relative Abundance	Frequency of Occurence
Species Observed During Formal Breeding Bird Surveys					
American Goldfinch	*Carduelis tristis*	L/US	1	0.76%	0.08%
Black and White Warbler	*Mniotilta varia*	NT	5	3.82%	0.41%
Blackburnian Warbler	*Dendroica fusca*	NT	17	12.98%	0.67%
Black-capped Chickadee	*Poecile atricapillus*	L	2	1.53%	0.08%
Black-throated Blue Warbler	*Dendroica caerulescens*	US/NT	10	7.63%	0.67%
Blue Jay	*Cyanocitta cristata*	US/L	4	3.05%	0.33%
Cedar Waxwing	*Bombycilla cedrorum*	L/US	2	1.53%	0.08%
Chesnut-sided Warbler	*Dendroica pensylvanica*	NT	2	1.53%	0.08%
Common Yellowthroat	*Geothlypis trichas*	NT	2	1.53%	0.08%
Eastern Wood Pewee	*Empidonax*	NT	4	3.05%	0.33%
Golden-crowned Kinglet	*Regulus calendula*	L/US	2	1.53%	0.17%
Hairy Woodpecker	*Picoides villosus*	L	6	4.58%	0.50%
Hermit Thrush	*Catharus guttatus*	US	9	6.87%	0.58%
Magnolia Warbler	*Dendroica magnolia*	NT	3	2.29%	0.17%
Morning Dove	*Zenaida macroura*	US/L	1	0.76%	0.08%
Myrtle Warbler	*Dendroica coronata*	US/NT	12	9.16%	0.58%
Ovenbird	*Seiurus aurocapillus*	US/NT	17	12.98%	0.67%
Purple Finch	*Carpodacus purpureus*	L/US	1	0.76%	0.08%
Red-breasted Nuthatch	*Sitta canadensis*	L/US	2	1.53%	0.17%
Red-eyed Vireo	*Vireo olivaceus*	NT	14	10.69%	0.67%
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	NT	3	2.29%	0.25%
Scarlet Tanager	*Piranga olivacea*	NT	3	2.29%	0.25%
Slate-colored Junco	*Junco hyemalis*	L/US	5	3.82%	0.33%
Winter Wren	*Troglodytes troglodytes*	US	2	1.53%	0.17%
Veery	*Catharus fuscescens*	NT	2	1.53%	0.08%
Total Species Observed During Formal Surveys		***25***			
Total Individuals Observed During Formal Surveys			***131***		
Species Recorded as Incidental Observations during Summer 2011					
American Redstart	*Detophaga ruticilla*	NT			
Barred Owl	*Strix varia*	US/L			
Blue-headed Vireo	*Vireo solitarius*	US/NT			
Broad-winged Hawk	*Buteo platypterus*	NT			
Brown Creeper	*Certhia americana*	na			
Common Nighthawk	*Chordeiles minor*	NT			
Cooper's Hawk	*Accipiter cooperii*	US/L			
Least Flycatcher	*Empidonax minimus*	NT			
Pileated Woodpecker	*Picadae*	L			
Red-tailed Hawk	*Buteo jamaicensis*	US/L			
Ruffed Grouse	*Bonasa umbellus*	L			
TurkeyVulture	Cathartes aura	US			
Wild Turkey	*Meleagris gallopavo*	L			
Yellow-bellied Sapsucker	*Sphyrapicus varius*	US			
Total Species Observed Incidentally		***14***			
Total Breeding Bird Species Recorded in 2011		***39***			

* L – Local year round resident; US – Migrates within US; NT – Neotropical migrant

(b) Diurnal Raptor Migration

Surveys for diurnal migrating raptors were performed during the spring and fall seasons of 2011. The purpose of these surveys was to document the numbers, species, and flight patterns of migrating raptors in the immediate Project vicinity. The protocol for diurnal raptor migration surveys at the proposed Antrim Wind Energy Project followed standards set forth by the Hawk Migration Association of North America (HMANA 2011), and by HawkWatch International (HawkWatch International 2011, Hoffman and Smith 2003). The full study report is provided in Appendix 12B of this Application.

Spring surveys for migrating raptors were performed in late March through late May, 2011. Fall surveys were performed between mid September and late November, 2011. Early survey dates (in March), and late survey dates (in November) were intended to capture the passage of species, such as golden eagles (*Aquila chrysaetos*), whose migration period is temporally extended.

Surveys were performed on multiple survey dates during each season. On each survey date, data was generally collected for eight consecutive hours between 9 AM to 5 PM. This timeframe encompasses the peak hours of thermal development and associated raptor movement. Sampling was performed based upon favorable weather for migration.

The spring 2011 diurnal raptor migration survey for the proposed Antrim Wind Energy Project consisted of 65 total hours of observation across 9 dates between March 25 and May 15. The fall survey consisted of 147.5 total hours of observation across 21 dates between September 1 and November 20.

In spring, a total of 441 individual raptors[1], representing eleven species were identified within the immediate vicinity of the proposed Antrim Wind Energy Project. The vast majority of individuals observed were turkey vultures, which comprised 54% (n=237) of all observations. The next most abundant species observed were broad winged hawks and red-tailed hawks at 18% (n-77) and 14% (n=60) relative abundance, respectively. All species observed and their relative abundance are listed in Table I.5.c(b).

In fall, a total of 978 individual raptors, representing 10 species were identified. The vast majority of these were broad-winged hawks, which comprised approximately 70% (n=689) of all observations. A total of 471 of these individuals were recorded on one date: September 18. The majority of these broad-wings passed in a few large aggregations ("kettles"). For comparison: on the same date (September 18), Carter Hill Observatory (in Concord, NH) recorded a total of 7,212 broad-winged hawks and Pack Monadnock Observatory (in Peterborough, NH) recorded 5,208. Large, temporally concentrated fall movement of broad-winged hawks is typical in New England. Red-tailed hawks and turkey vultures were the next most frequently observed species at

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[1] For the purpose of this study, the term "raptors" refers to all members of Order Falconiformes; this order currently includes the family Cathartidae (New World vultures).

approximately 8% and 6% relative abundance, respectively. All species observed and their relative abundance are listed in Table I.5.c(b).

Table I.5.c(b): Species List and Relative Abundance of Diurnally Migrating Raptors, Spring and Fall 2011.

Common Name	Binomial Nomenclature	Total Individuals Observed		Percent Relative Abundance	
		Spring	Fall	Spring	Fall
Accipiter spp. (small)	(n/a)	2	23	0.45%	2.35%
American Kestrel	*Falco sparverius*	1	0	0.23%	0.00%
Bald eagle	*Haliaeetus leucocephelus*	3	11	0.68%	1.12%
Broad-winged hawk	*Buteo platypterus*	77	689	17.46%	70.45%
Buteo spp.	(n/a)	30	22	6.80%	2.25%
Cooper's hawk	*Accipiter cooperii*	3	15	0.68%	1.53%
Falcon spp.	(n/a)	1	1	0.23%	0.10%
Golden eagle	*Aquila chrysaetos*	0	3	0.00%	0.31%
Merlin	*Falco columbarius*	0	3	0.00%	0.31%
Northern Goshawk	*Accipiter gentilis*	1	0	0.23%	0.00%
Northern Harrier	*Circus cyaneus*	5	0	1.13%	0.00%
Osprey	*Pandion haliaetus*	5	5	1.13%	0.51%
Peregrine Falcon	*Falco peregrinus*	1	0	0.23%	0.00%
Raptor spp.	(n/a)	13	48	2.95%	4.91%
Red-shouldered hawk	*Buteo lineatus*	0	1	0.00%	0.10%
Red-tailed hawk	*Buteo jamaicensis*	60	75	13.61%	7.67%
Sharp-shinned hawk	*Accipiter striatus*	2	19	0.45%	1.94%
Turkey vulture	*Cathartes aura*	237	63	53.74%	6.44%
TOTAL		441	978		

The overall passage rate in spring 2011was 6.78 birds per hour of effort (441 birds/65 hours) with a range of 1.88 to 14.25. The overall passage rate in fall was 6.63 birds per hour of effort (978 birds/147.5 hours) with a range of 0 to 61.75. These passage rates were compared to data from the five most comparable (in terms of proximity and geographic similarity) hawk watch sites for which data was available across the same sampling period. The spring average at Antrim (6.78 birds per hour of effort) is comparable to the spring average of 5.78 birds per hour of effort among five regional hawk watch sites. The spring maximum of 14.25 birds per hour of effort is well below the regional maximum of 49.08. The fall average of 6.63 birds per hour of effort is well below the regional average of 21.83; likewise, the fall max of 61.75 birds per hour of effort is significantly lower than the regional max of 730 birds per hour of effort. Full regional comparisons are provided in the diurnal raptor migration study report provided in Appendix 12Bof this Application.

Flight height (above ground level) was estimated for individuals that used the ridge area and upper slopes of Tuttle and Willard Mountains, as these are the areas where potential development has been considered or proposed over the course of Project planning.

The remaining birds were recorded as "outside" of the area of potential development. Flight height estimates were grouped into 3 categories: 0-50 feet above the ground, 50-500 feet above the ground, and 500+ feet above the ground. Estimation of raptor elevation can be influenced by perspective, distance, topography, observer and etc.; for this reason, flight height categories were designed conservatively. In order to produce the most conservative possible estimate of risk, these categories were also judged conservatively in the field, erring toward the 50-500-foot category.

Of 441 total raptors observed in spring 2011, 216 (49%) passed within the area of potential development. Of the birds that did fly within the area of potential development (n=216), 162 of them (or 37% of all birds observed) were judged to have flown within the 50-500-foot above ground range. Of the 162 birds that flew within this range, 108 of them were turkey vultures.

Of 978 total raptors observed in fall 2011, 460 of them (47%) were observed to pass within the area of potential development. Of the birds that did fly within the area of potential development (n=460), 296 of them (30% of all raptors recorded) were judged to have flown within the 50-500-foot above ground range. Of the 296 birds that flew within this range, 168 of them were broad-winged hawks; 104 of these passed in kettles on the single date of September 18.

Three listed Rare, Threatened, or Endangered raptor species were observed during spring and fall migration surveys for the proposed Antrim Wind Energy Project: bald eagle, golden eagle, and peregrine falcon. A total of 14 bald eagles were recorded (3 in spring and 11 in fall); 7 of these never flew within the area of proposed development. Of those bald eagles that did fly within the area of proposed development (n=7), 6 were judged to have passed within the 50-500 foot above-ground range. A total of 3 golden eagles were observed in the fall of 2011; one of these never flew within the area of proposed development. The remaining 2 golden eagles were judged to have passed within the 50-500 foot above-ground range within the area of proposed development. The single peregrine falcon that was observed in the spring of 2011 did not pass within the area of proposed development.

Overall, the observed species assemblage, relative abundance, and passage parameters were as expected for southern New Hampshire.

(c) Nocturnal Avian Migration

Nocturnal radar surveys for avian migration were performed for the proposed Antrim Wind Energy Project in spring and fall 2011. These studies served to assess and characterize nocturnal avian migration patterns in the proposed Project area. The objective of the study was to document the overall passage rates for nocturnal avian migration in the vicinity of the Project area, including the number of migrants, their flight direction, and their flight altitude. The full study report on nocturnal avian migration is provided in Appendix 12C of this Application.

Radar was operated from one location, near the meteorological tower on the northeastern end of Tuttle Hill. Spring radar surveys were conducted from sunset to sunrise on 30 nights between April 18 and May 26, 2011 resulting in 284 total hours surveyed. Fall radar surveys were conducted during 30 nights between August 17 and October 8, 2011 resulting in 327 total hours surveyed.

Video samples were analyzed using specialized digital analysis software. Data analysis included the removal of insects based on flight speed and the calculation of migration passage (traffic) rates over the radar location. Passage rates (expressed in targets/kilometer/hour) were summarized hourly for each night as well as the overall mean and median nightly passage rates for the entire season. The mean flight direction of recorded targets was calculated for each night of data collected. These were also summarized by night and for the entire season. Mean flight height of targets and percentage of targets below maximum turbine height was determined using the vertical data and summarized by hour, night, and season.

<u>Spring Results</u>

The overall mean passage rate for the entire spring survey period was 223 ± 23 targets per kilometer per hour (t/km/hr), and nightly passage rates varied from 6 ± 3 t/km/hr on May 17 to 1215 ± 299 t/km/hr on May 20.

Individual hourly passage rates varied between nights and throughout the season, and ranged from 0 t/km/hr during various hours of various nights, to 2279 t/km/hr during the 7th hour of May 20. For the entire season, mean passage rates increased rapidly between hours one and two after sunset, then gradually increased to the 6th hour after sunset before steadily declining until sunrise.

Mean flight direction through the Project area in the spring was generally northeast (44° ± 49°), but varied between nights.

The seasonal mean flight height of targets was 305 ± 1 meters (m; 1000 ft [']) above the radar site, and nightly flight heights ranged from 135 ± 31 m to 486 ± 85 m. Flight heights, when analyzed for the anticipated 150 m (492') height of the proposed turbines; indicate that the percentage of targets flying below turbine height ranged from 7 to 63 percent with a seasonal average of 30 percent.

These results are within the range of those recorded at other radar studies conducted in the Northeast.

<u>Fall Results</u>

The overall passage rate for the entire fall survey period was 138 ± 9 targets per kilometer per hour (t/km/hr). Fall nightly passage rates varied from 4 ± 2 t/km/hr on October 1 to 538 ± 71 t/km/h on August 26. Individual hourly passage rates varied between nights and throughout the season, and ranged from 0 t/km/hr during various hours of various nights to 839 t/km/hr during the 2nd hour of August 26. For the entire season, mean passage rates increased rapidly between the 1st and 3rd hours after sunset, then gradually declined until sunrise.

Mean flight direction through the Project area in the fall was generally southwest (217° ± 56°), but varied between nights.

The fall seasonal mean flight height of targets was 203 ± 1 m (666') above the radar site. The average nightly flight height ranged from 147 ± 23 m on August 24 to 266 ± 45 m on September 9. The percent of targets observed flying below 150 m was 40 percent for the season and varied nightly from 25 percent (169 targets) on September 9 to 56 percent (74 targets) on August 18 (Figure 2-9). For the entire fall season, the mean hourly flight heights were lowest during 1st and 10th hour after sunset.

The fall average flight height (203 ± 1 m) is among the lowest average flight heights recorded among other radar studies conducted in the eastern United States (287 m to 583 m). The recorded flight height of 203 ± 1 m is, however, above the proposed turbine height (150 m) for the Project. The nightly average flight height was below the proposed turbine height on one night (August 24) and at the proposed turbine height on one night (October 1). Passage rates on these nights were low: 38 t/km/hr on August 24 and 4 t/km/hr on October 1.

In summary, fall radar surveys in the Project area documented passage rates and migration patterns similar to those recently documented at other locations in New Hampshire and the eastern United States. Average flight height, however, was at the low end of the range of flight heights documented at other regional locations.

(d) Rare Raptor Nesting Survey

An assessment of rare raptor nesting in the vicinity of the proposed Antrim Wind Energy Project was conducted in 2011. The purpose of the rare raptor nest survey was to determine the current status of bald eagle, golden eagle, and peregrine falcon breeding activity in the Project area and surrounding vicinity. The full rare raptor nest survey report is provided in Appendix 12D of this Application.

A desktop research exercise, including data inquiries, was conducted to ascertain the location of any historic nest locations or potential nesting habitats for the species being assessed. Through this exercise, and associated consultation with the agencies, it was determined that rare raptor nest survey for this area should focus on bald eagle nesting. Pursuant to this consultation, an aerial survey was conducted on May 6, 2011 in an effort to identify and document bald eagle nesting activity within a 10-mile radius of the proposed Antrim Wind Energy Project.

During the aerial survey, two biologists (both experienced in conducting aerial avian and wildlife surveys) visually inspected the shoreline and islands of 34 lakes and ponds that were identified as having potential bald eagle breeding habitat (i.e. ponds greater than 35 acres in size) and which were located (at least partially) within a 10-mile radius of the proposed Project area. The survey was performed from a helicopter which flew as low and as slow as possible. The survey was performed during favorable weather conditions, which consisted of calm to light winds and clear conditions with unlimited visibility.

During the survey, bald eagle nesting was confirmed at Nubanusit Lake. One adult bald eagle was observed sitting on a nest located on the north shore, on the far west end of the north arm of Nubanusit Lake. This nest is located approximately 3.2 miles from the southwest end of the proposed Project. At least two chicks (in gray down) were also confirmed on the nest during the flight.

Nubanusit Lake is a known historic bald eagle nesting territory which has been occupied for 15 years (1997-2011). Nesting was documented in 13 of these years. This 15-year-long occupation constitutes the second most persistent bald eagle territory documented within the State of New Hampshire since 1988 (a territory at Lake Umbagog has been occupied during 22 years of monitoring). (New Hampshire Audubon 2010). The female at this territory was banded as a fledgling (in Massachusetts) in 1992 and has been confirmed present at Nubanusit Lake since 1999; in October of 2011, this female was found mortally injured at the age of 19 ½ years of age (New Hampshire Audubon 2011). It is considered likely that a new female will occupy the matriarchal vacancy at Nubanusit Lake at some point in the future.

The Nubanusit Lake bald eagle territory is one of 22 occupied territories identified in New Hampshire as of 2010. The number of occupied bald eagle territories has been increasing in New Hampshire: the 22 occupied territories in 2010 represent a "record-high" as of that year, and a one-year increase of 10% compared to the previous high of 20 occupied territories documented in 2009. (New Hampshire Audubon 2010).

(e) Acoustic Bat Monitoring

A passive acoustic bat monitoring survey was performed in the area of the proposed Antrim Wind Energy Project in 2011. The purpose of this survey was to sample and document bat activity patterns and species composition within the proposed Project area during spring, summer and fall seasons, when bats are known to be active. The full study report on acoustic bat monitoring is provided in Appendix 12C of this Application.

Anabat II detectors (Titley Electronics Pty Ltd.) were used based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad frequency range, which allows detection of all species of bats known to occur in New Hampshire.

A total of six detectors were deployed in the proposed Project area by April 7, 2011. Two detectors were deployed on the guy wires of an existing meteorological tower located at the east end of the Tuttle range. The remaining four detectors were deployed throughout the proposed Project area. These detectors were suspended from trees along forested corridors and adjacent to wetlands where bats are likely travel or forage. Detectors were programmed to begin monitoring at one half hour before sunset each night, and to end monitoring at one half hour after sunrise each morning. The detectors were downloaded periodically during the study timeframe, and were removed in late October, 2011.

All data collected was inspected to screen out bat calls, and each call file was identified to guild and to species, when possible. This method of guild identification represents a conservative approach to bat call identification.

Detailed weather data as recorded by the meteorological tower on Tuttle Hill was also obtained. These data were applied to describe bat activity levels in relation to site-specific weather variables, as such variables have been documented to affect rates of bat mortality at operational projects in the Northeast.

Spring Results

Spring acoustic bat surveys were conducted between April 7 and June 1, 2011. The six detectors recorded a total of 1,483 bat call sequences yielding an overall detection rate of 4.9 bat call sequences per detector-night.

Rate of detection varied among individual detectors (ranging from 5 sequences at the high detector on the met tower, to 760 sequences at a lower elevation, forested site). Detection rates also varied by night, ranging from 0.1 sequences per detector-night, to 14.1 sequences per detector-night. These types of variation are typical of this type of survey.

Bats within the *Myotis* genus comprised the greatest overall percentage of detected call sequences (32 %) recorded in the spring; however, most of these sequences were recorded at a single detector over only a few nights. The big brown bat/silver-haired bat guild was the second most commonly identified guild, comprising 31 percent of the total call sequences recorded. Most call sequences within this guild were identified as big brown bats or big brown/silver-haired bats, and only a small fraction were classified as silver-haired bats. Hoary bats comprised 12 percent of bat call sequences recorded; this species was recorded at all six detectors. The eastern red bat/tri-colored bat guild was the least commonly detected guild, comprising only 1 percent of the recorded call sequences. Twenty-four percent of call sequences were classified as "unknown" due to their relatively short length or quality.

Overall, spring 2011 acoustic bat surveys documented variable activity levels within the Project area, although results suggest that activity increased in May relative to April.

Summer/Fall Results

Summer/fall acoustic bat surveys were conducted between June 1 and October 23, 2011. The six detectors recorded a total of 35,450 bat call sequences yielding an overall detection rate of 52.4 bat call sequences per detector-night.

Among sampling locations, detection rates ranged from 2.6 to 126.2 bat call sequences per detector-night. Typical of this type of survey, activity levels varied considerably among nights within the survey period and among detectors. Bats within the big brown bat/silver-haired bat (BBSH) guild comprised the greatest overall percentage of detected call sequences (48%, n=17,006). The majority of BBSH calls were recorded at the low detector positioned on the met tower. The eastern red bat/tri-colored bat guild comprised 15 percent of the recorded call sequences. The *Myotis* guild comprised 12 percent and the hoary bat guild comprised 5 percent of the recorded call sequences. Twenty of call sequences were classified as "unknown" due to their relatively short length or quality.

Of note, hoary bats were detected at five of the six detectors during the summer/fall study period, and species belonging to the *Myotis* guild and the eastern red bat/tri-colored bat guild were recorded by all six detectors.

Overall, summer/fall 2011 acoustic bat surveys documented variable activity levels within the Project area, although results suggest that activity was highest in July and August.

(f) Bat Mist Netting Survey

A bat mist netting survey was conducted for the proposed Project in the summer of 2011. The full bat mist netting survey report is provided in Appendix 12E of this Application.

Consultation with the New Hampshire Fish and Game Department ("NHFGD") and the U.S. Fish and Wildlife Service ("USFWS") on June 21, 2011 resulted in an agreed upon protocol for a mist net survey at the proposed Project. The primary objective of this summer survey was to document the potential presence of the eight bat species known to occur in the region.

The summer 2011 mist net survey was conducted at four survey sites, as agreed upon during consultation. Two of these sites were located at the south end of the proposed area of Project development, on or near Willard Mountain; one site was located in a wetland near the center of the area of proposed development; and one site was located near the existing meteorological tower on Tuttle Hill, at the northeast end of the area of proposed development. There were no suitable mist net sites on the immediate summits of Tuttle Hill or Willard Mountain, so sites were placed slightly off the peaks where better canopy closure provided more suitable mist net set locations.

The location of mist net sites was based on habitat features that may be selected by foraging little brown and northern long-eared bats, as well as eastern small-footed bats. Good-quality bat capture sites were sought; such sites are located in potential travel corridors such as forest roads, trails, streams, or other linear corridors that serve to funnel traveling bats into mist nets.

Mist net surveys were conducted on eight survey nights, which commenced on July 12, 2011 and were completed on July 28, 2011. During each sampling event, two mist net sets were erected over trails, roads, or across forest gaps. Each mist net set contained three vertically-stacked nets.

One bat was captured during 41 total survey hours among the four survey sites. This juvenile, male, big brown bat (*Eptesicus fuscus*), weighing 17.25 grams, was captured on July 27, 2011 at the northeastern survey site (located down slope from the meteorological tower on Tuttle Hill). This bat was banded with NHFG band # 43152. No other bats were captured during the bat mist netting survey.

Low capture rates were not unexpected for this survey location. Mist net surveys can be biased toward those species that fly beneath the forest canopy such as North American *Myotis* species; as such, the relative abundance of expected captures is expected to trend toward *Myotis* species. In New England, high concentrations of *Myotis* species are generally expected at low elevations, where temperatures tend to be warmer and more stable than at higher elevations; however, *Myotis* bats are still expected to be present and active in lower concentrations at higher elevations such as ridge tops. For these reasons, it was expected that this study would result in the capture of at least some *Myotis* bats. The capture of only one bat (which was not a *Myotis* species) was not the expected outcome of this effort. While it is not known, it is possible that the capture of only a single individual is indicative of diminished populations of bats as a result of white-nose syndrome ("WNS").

WNS is an emerging disease that has spread throughout the New England states in the past five years and has resulted in the unprecedented devastation of all 6 bat species that hibernate in caves or mines in the northeast. *Myotis* species have been most affected by this disease. New Hampshire may soon list the little brown bat (*Myotis lucifugus*) and the northern long-eared bat (*Myotis septentrionalis*) as state endangered or threatened, due to rapid and dramatic population decline caused by WNS.

(g) Impacts and Mitigation for Avian and Bat Species

Potential impacts to birds and bats during operation of the facility include direct mortality through either collision or barotrauma, and indirect impacts such as habitat loss through displacement or increased energy demands due to turbine avoidance during migration. In order to address each type of potential impact, AWE has developed an Avian and Bat Protection Plan ("ABPP") for the Antrim Wind Energy Project.

The ABPP describes, in detail, the tiered approach that was used to assess potential risk to avian and bat species associated with the proposed Antrim Wind Energy Project. It also describes how the results of wildlife studies have been and will be applied during Project design, construction and operation in order to avoid and minimize impacts to avian and bat species. Furthermore, post-construction study, monitoring and reporting commitments are defined. Finally, an adaptive management plan is proposed for addressing potential changes and unexpected events over the life of the Project. The complete Avian and Bat Protection Plan is provided in Appendix 12F to this Application.

It should be noted that in the past, developers have conducted extensive pre-construction risk assessments to calculate expected mortality at their proposed facilities. Recent studies have shown, however, that there is little correlation between pre-construction risk assessments and actual mortality of avian species at wind farms (Ferrer et al. 2011, de Lucas et al. 2008, Sharp et al. 2011). As such, it is difficult to predict expected mortality rates at a proposed facility. The ABPP is designed to continuously work with USFWS and NHFGD in order to adapt to unknown circumstances, so that unexpected events and changes over time may be addressed.

In addition, AWE has successfully negotiated several local land conservation agreements which will protect approximately 685 acres of land within and adjacent to the proposed Project. This initiative will conserve valuable undeveloped lands in perpetuity. These lands include foraging and nesting or roosting (for tree roosting bat species) habitat for the typical avian and bat species that are expected to occur in the vicinity of the proposed Project.

It should also be noted that the proposed Project is a clean and renewable energy facility that will displace need for energy from other sources which produce toxic waste (see Section I.3). This elimination of tons of toxic waste from our atmosphere as a result of Project operation provides a net environmental benefit to wildlife populations, including birds and bats.

I.6. Public health and safety

AWE is committed to building and operating the Project with the utmost concern for public health and safety. Below is a discussion of how AWE will address various areas of public health and safety.

I.6.a. Noise

AWE will not produce noise at such levels that would unreasonably adversely affect nearby residents or the general public.

A comprehensive sound level assessment was conducted for AWE by Epsilon and Associates, Inc. Baseline sound levels were measured to characterize the existing background sound levels within the area. Turbine-only sound levels were then predicted throughout the entire wind farm and off-site, so as to determine future sound levels. In making these predictions, modeling was based on the Acciona AW-116/3000 turbine, which was conservatively selected to represent the largest and loudest unit the Project might employ. Sound levels due to wind turbine operation are expected to be less than 45 dBA at all residences, the nearest one being a half mile away. While there are no federal, state, or existing local noise standards which would apply to the Project, it is instructive to note that the Project's projected noise levels will be well below the standards outlined by the SEC in its decisions on comparable wind turbine projects (Granite Reliable Power Windpark and Groton Wind) as well as community noise guidelines published by the World Health Organization and the U.S. Environmental Protection Agency.

As noted earlier, the Project also includes a collector substation with a transformer. When transformer noise was considered in the sound level assessments, the cumulative sound levels at all residences remained below the 45dBA level described above. Please see Appendix 13A for a copy of the Sound Level Assessment Report and the accompanying memorandum regarding transformer noise.

I.6.b. Ice Shedding

The potential risk to the public due to ice shedding is minimal. If an icing event does occur, the turbines will sense blade imbalances due to ice build-up and shut down automatically until the icing subsides. The access road, which is the primary means of access to the Project area, will be secured with a locked gate. Clearly visible warning signs concerning safety risks related to winter or storm conditions will be placed on all informal roads and trails in the vicinity of the Project at no less than 500 feet from each Wind Turbine tower base. In addition, the Project is located in a remote and undeveloped area (as previously discussed, the nearest residence is one half-mile away), with significant setbacks from adjacent property lines. In its draft agreement with the Town of Antrim (Appendix 17), AWE has committed to maintaining a setback of a minimum of three times the turbine height from any non-participating landowner's existing occupied building and at least 1.5 times the turbine height from the nearest public road right-of-way. For the two turbines closest to property lines, AWE has a setback waiver from the abutter for one, and the other maintains a setback of 1.1 times the blade tip height, which is well beyond industry practice employed to protect abutting properties from ice throw risk. Of note, the latter property is a woodlot, and is not a residential property.

I.6.c. Tower Collapse/Blade Throw

Tower collapse and blade throw incidents are extremely rare, are primarily associated with the early years of modern wind power production, and currently represent minimal danger to public health and safety. Industry improvements in design, manufacturing, and installation have greatly reduced such occurrences. Each AWE turbine will be designed in accordance with international engineering standards, and are equipped with safety features designed to minimize the chance of tower collapse or blade throw. There have been no instances of steel tower collapse or blade throw with the AW-116 or its predecessor models. In addition the remote nature of the Project site on private land further reduces the threat that these types of events may pose to the public.

I.6.d. Shadow Flicker

Rotating turbine blades which create intermittent shadows that fall inside a structure can create a flicker effect known as "shadow flicker". This phenomenon only occurs under certain circumstances: the turbine blades must be rotating; it must be daylight; the sun must be low in the sky so as to cast shadows; the structure must have a narrow opening or unshaded window that faces the turbine; the structure must be within ten rotor diameters of the turbine; and there must also be someone present to experience the shadow flicker effect. Without all of these variables happening simultaneously, the shadow flicker has no impact. Therefore, not only is shadow flicker not an every day event, it only occurs if several very specific conditions are present.

AWE enlisted Saratoga Associates to perform a Shadow Flicker study for the Project. The study report on shadow flicker is provided in Appendix 13 B of this Application. The study used widely-accepted modeling software in its evaluation, taking into account terrain, latitude and longitude, turbine dimensions, blade rotation speed, expected rotor operational time, expected rotor orientation, sun coverage, sun angle, sunshine probabilities, and the locations of potentially affected structures (it was assumed that each structure had windows all the way around). The study conservatively assumed that the area lacks vegetation and intervening structures. Because of this some structures which are shown to have the potential to experience shadow flicker may in fact be screened by vegetation.

As the study shows, thirty-six structures were found to be within 1,160 meters (approximately 10 rotor diameters) of the Project. Of that number nearly half (47.2% or 17) of the structures do not fall within the shadow zone, and 30.6% (or 11) have an expected shadow duration of only between 2 and 10 hours per year. 19.4% (or 7) of the structures have an expected shadow duration of between 10 and 20 hours per year, and none of these structures, as determined in the Visual Impact Analysis (Appendix 9A), has a view of the Project due to the intervening vegetation; actual shadow duration at these structures could be much lower. The structure most susceptible to shadow flicker, having an expected shadow duration of just over 21 hours per year, is a seasonal hunting camp that does not have a view of the Project. Due to the seasonal nature of the structure and the presence of intervening vegetation, the actual impact of shadow flicker on this structure is expected to be much less than indicated by the study.

New Hampshire does not have published regulations or guidelines that establish an acceptable degree of shadow flicker impact. However, many European countries have identified 30 hours of shadow flicker as an allowable threshold; anything above this would be considered a nuisance and require mitigation. Based on the guidelines from the above study, the Project is not expected to produce an unacceptable level of shadow flicker.

I.6.e. Lightning Strikes

Should a lightning strike occur, each turbine is equipped with lightning protection equipment which conducts the lightning from the blade to the tower via a grounding system. This prevents damage to the blade, the tower, and the electrical components. As a result lightning strikes do not present any danger to the health and safety of the public.

I.6.f. Fire

Fires associated with wind turbines are extremely rare. There are very flew flammable components. The use of lubricating and other oils and the presence of electrical components, however, do present a potential for fire. The Acciona AW-116/3000 WTG has a fire detection system which is connected to the main control unit and to the SCADA. If any smoke is detected in the WTG, the SCADA system will automatically shut the turbine down and send an alarm to the control room. Each Acciona AW-116/3000 WTG is also equipped with manually operated fire extinguishers. Additionally, all maintenance vehicles will be equipped with fire extinguishers and all maintenance personnel will be trained to respond appropriately to smoke and fire events. AWE is committed to providing appropriate training to local emergency responders. AWE has met with the State Fire Marshal's Office to discuss fire safety issues associated with the Project and will continue to work cooperatively with that Office to address any concerns that might arise. In its draft agreement with the Town of Antrim (Appendix 17), AWE has agreed to cooperate with local emergency responders to develop and coordinate implementation of an emergency response plan for the Project. AWE has also agreed to cooperate with the Town to determine the need for the purchase of any equipment required to provide adequate emergency response to the site. In addition, should an emergency response event related to the Project result in an extraordinary expense by the Town, AWE has proposed to provide appropriate financial reimbursement.

I.6.g. Aviation Safety

The Federal Aviation Administration has issued a Determination of No Hazard to Air Navigation for all 10 turbines located in the Project. A copy of the Determination can be found at Appendix 2E. AWE will comply with all FAA requirements for marking and/or lighting of tall structures. In accordance with these requirements, all towers will be painted white for daytime visibility. Six of the turbines will have a single medium-intensity flashing red light, attached on top of the nacelles of the turbines.

I.6.h. Hazardous Materials

Please see Section E.6.b. for a discussion of the issue of hazardous materials.

I.6.i. Stray Voltage

Stray voltage is a small voltage (less than 10V as defined by the U.S. Department of Agriculture) that is generally caused by common neutral to earth grounding. Stray voltage will not be an issue at the Antrim Project because neutral currents will be extremely minimal if not zero, and the turbines will be significantly bonded to the grounding system. All related metal structures, equipment, wires and cabling will be isolated and/or guarded to prevent public contact.

I.6.j. Limiting Access

Access to the Project site will be limited to authorized personnel. As noted earlier, the entire Project will be located on private land with no formal public access. The access road, accessible by only one public location, will be gated and locked. As noted above in I.6.b, and as outlined in the draft agreement between AWE and the Town of Antrim (Appendix 17), warning signs will be placed in areas of informal access at no less than 500 feet from the base of each turbine along informal roads and trails. Wind turbine exteriors shall not be climbable up to fifteen feet above the ground, and all access doors to wind turbines and electrical equipment will be locked, fenced, or both, as appropriate. Warning signs concerning voltage will be placed on all of the Project's aboveground electrical collection facilities as well as at the collection and interconnection substations.

J. EFFECTS OF THE FACILITY ON THE ORDERLY DEVELOPMENT OF THE REGION AND ESTIMATE OF THE IMPACTS OF CONSTRUCTION AND OPERATION OF THE FACILITY ON:

J.1. Local land use

Apart from the immediate Project area, local land uses will be able to continue in much the same manner as they have for several decades. Much of the land surrounding the Project area is open space, significant portions of which have been placed in various forms of conservation status. Other local land uses include timber harvesting, passive recreation, and widely scattered residential areas. For several reasons the Project is compatible with these local land uses.

AWE has leased approximately 1,850 acres of private land on seven parcels for the development of the Project. Including anticipated setbacks and undisturbed buffer areas, the Project will occupy approximately 70 acres, with approximately 57 acres of permanent development in the form of roads, turbine foundations, and other facilities. The rest of the land will remain as de facto open space, with approximately 685 acres of land placed into permanent conservation within 180 days of the commercial operations date of the Project. Development pressure on the remaining land outside that which will be conserved will be reduced as a result of the Project, as there will be significantly less motivation for landowners to consider developing or subdividing their land. In addition, local landowners who have leased their lands to AWE will retain rights to their land, which will allow them to use it much as they currently do. The Project, therefore, represents a reasonable degree of development that also largely preserves the status of an area that has long been associated with open space, commercial timber production, and passive recreation.

Commercial timber production

Timber harvesting has been occurring in this area for many decades. In fact, as noted earlier, hundreds of acres within the Project area (but unrelated to the Project) have been logged as recently as last year. Local landscape features reflect these management practices, with haul roads and different forest cover types and ages evident. Landowners who have leased their land to AWE will retain the right to harvest timber on their properties much as they do today. As a result, the Project is not expected to significantly restrict this historic use of local lands.

Outdoor recreation

The Project is not expected to significantly impact the public's ability to use the general area for outdoor recreation. As can be seen in Figure J.1, the only formal recreation (a hiking trail) area is within one mile of the Project. Informal local recreation such as hiking and hunting is anticipated to continue unrestricted in the Project area, except in the immediate vicinity of the Project facilities. The Project area will not be fenced, with the exception of the substation yard and operations and maintenance building; these structures are located close to the PSNH corridor and Rte. 9 and are not in an area that is likely to be used for recreational activities. In addition, the new conservation land area will be, for the most part, open to public access and will preserve or enhance recreational activities should the Project be built.

Non-motorized trails

The Project does not directly impact any non-motorized trails, as there are no maintained public-access trails on any of the parcels leased by AWE. Non-motorized trails that do exist within the broader area will continue to be used as they are today. Please see section I.1.a for a discussion of potential visual impacts to these recreation resources.

Wildlife and bird watching

As noted earlier, the Project is located entirely on private land, with no formal public access points and no maintained public trail systems. Wildlife and bird watching activities are generally limited to lands adjacent to the Project area. These lands include the Hosmer Wildlife Management Area (managed by the State of New Hampshire) and the dePierrefeu-Willard Pond Wildlife Sanctuary (owned and managed by New Hampshire Audubon). Please see Section I.1.a for a discussion of potential visual impacts to these areas. Please also see Section I.5.b for a discussion of potential impacts of the development of the Project on wildlife and birds.

Motorized trails

There are no maintained motorized trail systems on any of the parcels leased by AWE. As a result the Project will not impact the public's ability to use the existing motorized trail systems within the general area.

Hunting and Fishing

Local landowners who have leased land to AWE will continue to determine whether to allow hunting on their lands. As noted above, apart from the immediate Project area the lands leased by AWE will remain as de facto open space, thereby continuing to provide land available for hunting should individual landowners wish to allow it. Therefore the Project is not expected to have a significant impact on hunting activities. In addition, the Project does not directly impact any fisheries, such as streams, ponds, or lakes, so there will be no impact on fishing opportunities.

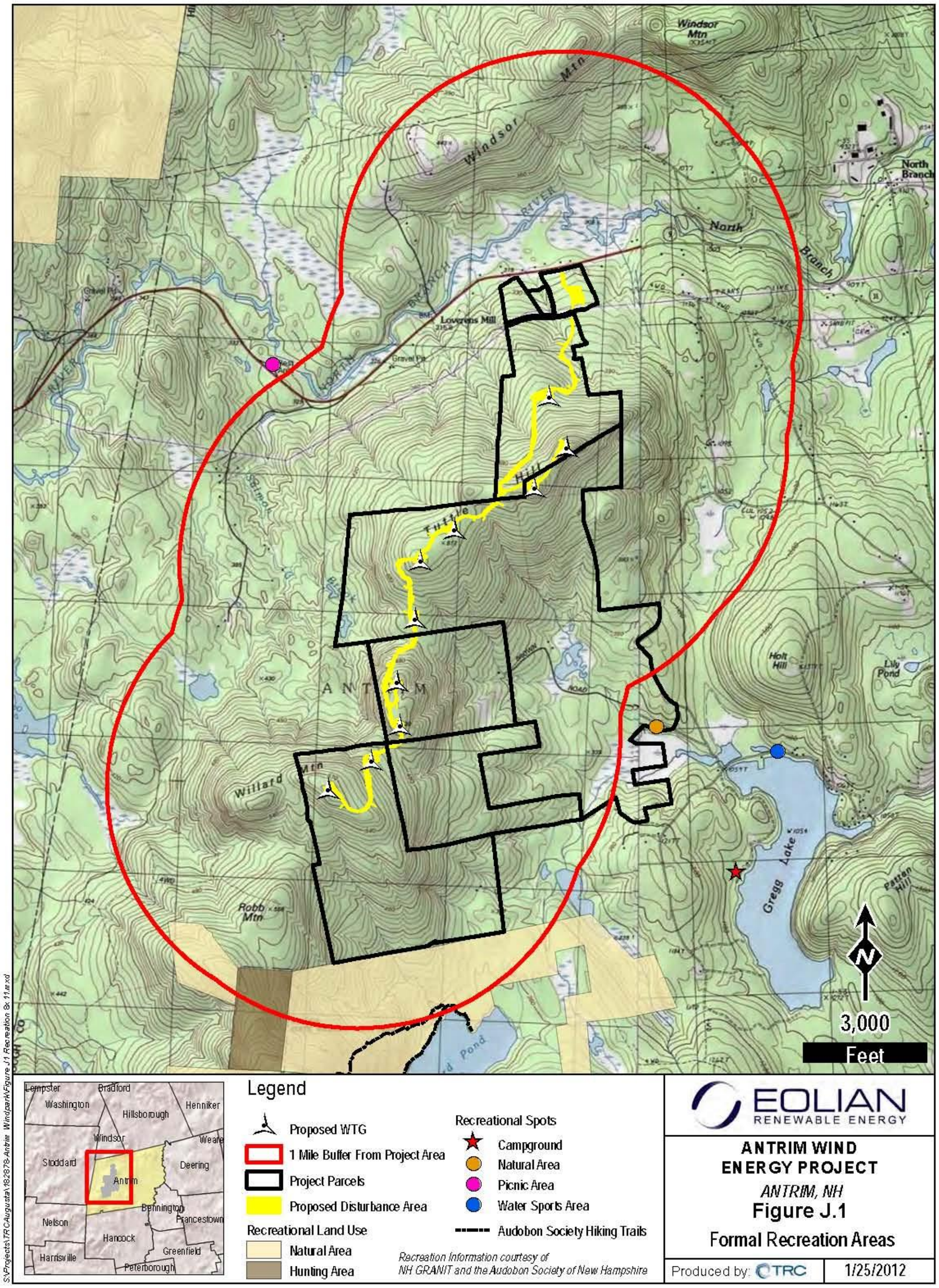
Boating

The Project will not directly impact boating opportunities. Gregg Lake and Willard Pond, both of which are more than one mile away from the nearest turbine, are the nearest bodies of water with public boating access. Please see Section I.1.a for a discussion of potential visual impacts to these recreation resources.

Swimming

The Town of Antrim maintains a public swimming beach on Gregg Lake. The Project will not directly impact the public's ability to access or use the beach. Please see Section 1.1.a for a discussion of potential visual impacts to this recreation resource.

Figure J.1: Formal Recreation Areas Map



J.2. Local economy

J.2.(a) Economic Effects

Wind power development offers significant economic benefits from the associated manufacturing, permitting, construction, and on-going operation activities. The economic benefits of wind projects for communities include the creation of local jobs, increased tax revenues, and generation of lease income for landowners.

The Project's development activities have already begun to bring investment into the local area economy. To date, AWE has spent over $1.85 million on development activities, with over 45% being spent in New Hampshire on services including professional services, lease payments, and surveying.

AWE contracted with Professor Ross Gittell from the University of New Hampshire's Whittemore School of Business and Economics to study the potential economic impacts of the Project. As the economic study (Appendix 14A) demonstrates, the economic benefits for Hillsborough County and the surrounding area of southern New Hampshire from the Project are expected to be significant.

J.2.(b) Property Values

It is anticipated that the Project will not have a significant adverse impact on residential property values. There is a growing body of research on the impact of wind energy projects on residential property values. In general this research has not found a statistically significant decline in property values as a result of wind power projects. However, none of the existing research has specifically focused on the New England region or on New Hampshire projects. In large part this is due to the relatively recent emergence of wind power projects in New England.

AWE contracted with Professor Ross Gittell from the University of New Hampshire's Whittemore School of Business and Economics to investigate the impact of the Lempster Wind 24 MW (12 turbine) wind energy project located in the Town of Lempster, Sullivan County, New Hampshire. This is the first significant commercial wind energy installation in New Hampshire and became operational in the fourth quarter of 2008. As such, the Lempster project serves as a relevant case study to assess the impact of wind energy development on property values in New Hampshire. Since the completion of the construction period, there have been 36 arms-length property transactions in Lempster and 212 arms-length property transactions in the bordering towns of Acworth, Goshen, Marlow, Unity, and Washington.

The study found that local assessment of wind energy projects is important as each site has its own unique characteristics, terrain, and geographical features. An important feature of the Lempster project is that the hilly terrain and high level of forest cover serve to limit views of the turbine to relatively narrow ranges. This allowed for comparison of visually impacted with non-visually impacted properties within a very narrow geographic region.

Significantly, the Gittell study found that there is no evidence to suggest the Lempster Wind project has negatively impacted property values within the view shed of the project. Given that the proposed Project in Antrim has similar characteristics to the Lempster project, including especially the presence of hilly terrain and a high level of forest cover which limit visual impacts, it is expected that there will be no significant adverse impact on property values as a result of the Project.

J.3. Local employment

The construction phase of the Project is the time period when there will be the greatest economic activity and benefits for Hillsborough County and the surrounding area, contributing $12 million to the local economy. During this phase, the Project is expected to create a total of 86 full-time equivalent (FTE) local jobs. This employment figure includes jobs directly filled by local labor and consists of construction employment and indirect and induced employment from project wages and local project expenditures (the so-called multiplier effect). Of these 86 jobs, there will be a total 23 FTE jobs directly involved in construction that are expected to be filled by New Hampshire resident workers.

Once the Project is complete it is expected to contribute $2.3 million annually to the local economy through the creation of an estimated 3 FTE jobs for workers employed by AWE and an additional 10 jobs in the local area economy through the expenditures of the Project including employee salaries, local supplies and services, land owner payments, and local tax payments. Total direct, indirect, and induced benefits to the local economy to the local economy from the Project are expected to be $55.7 million.

Many of the new jobs created by the Project can be termed “Green Jobs”. Green jobs are jobs that involve, develop, or employ environmentally friendly practices or technologies; this includes the renewable energy sector. These type of jobs tend to be high quality and well-paid. The jobs involved in the construction of the Project are expected to pay $54,222 in annual wages, 12% higher than the local area average annual wage of $46,685.

The development of the Project, then, is expected to have a significant immediate and long-term positive impact on the local economy through the creation of jobs, increased tax revenues, and lease payments to local landowners.

K. PRE-FILED TESTIMONY AND EXHIBITS SUPPORTING THE APPLICATION

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